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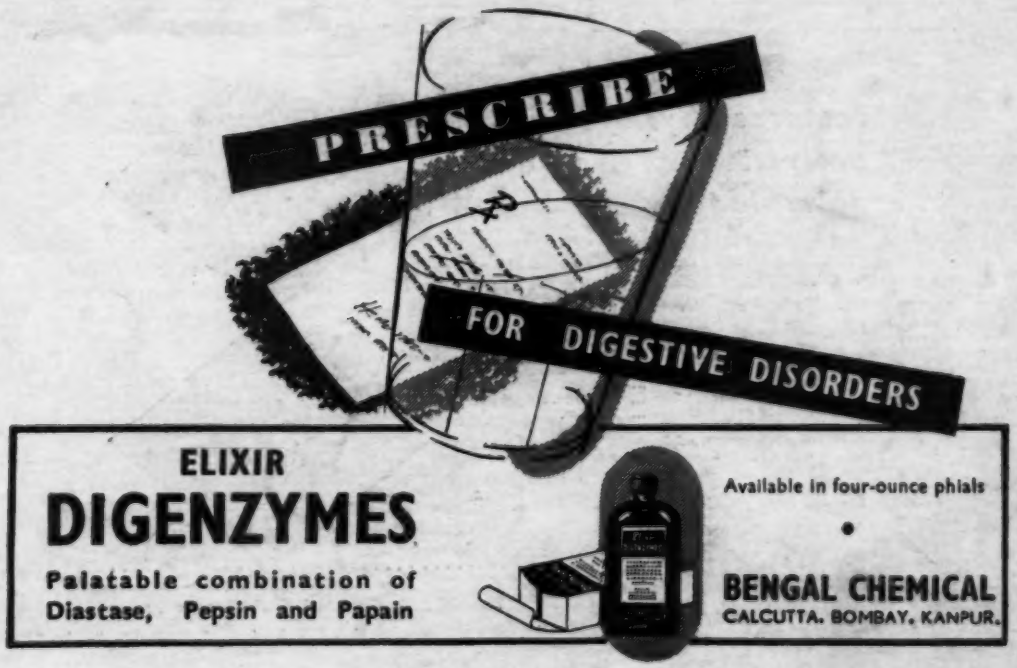

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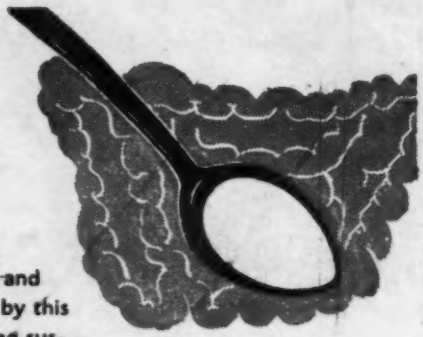

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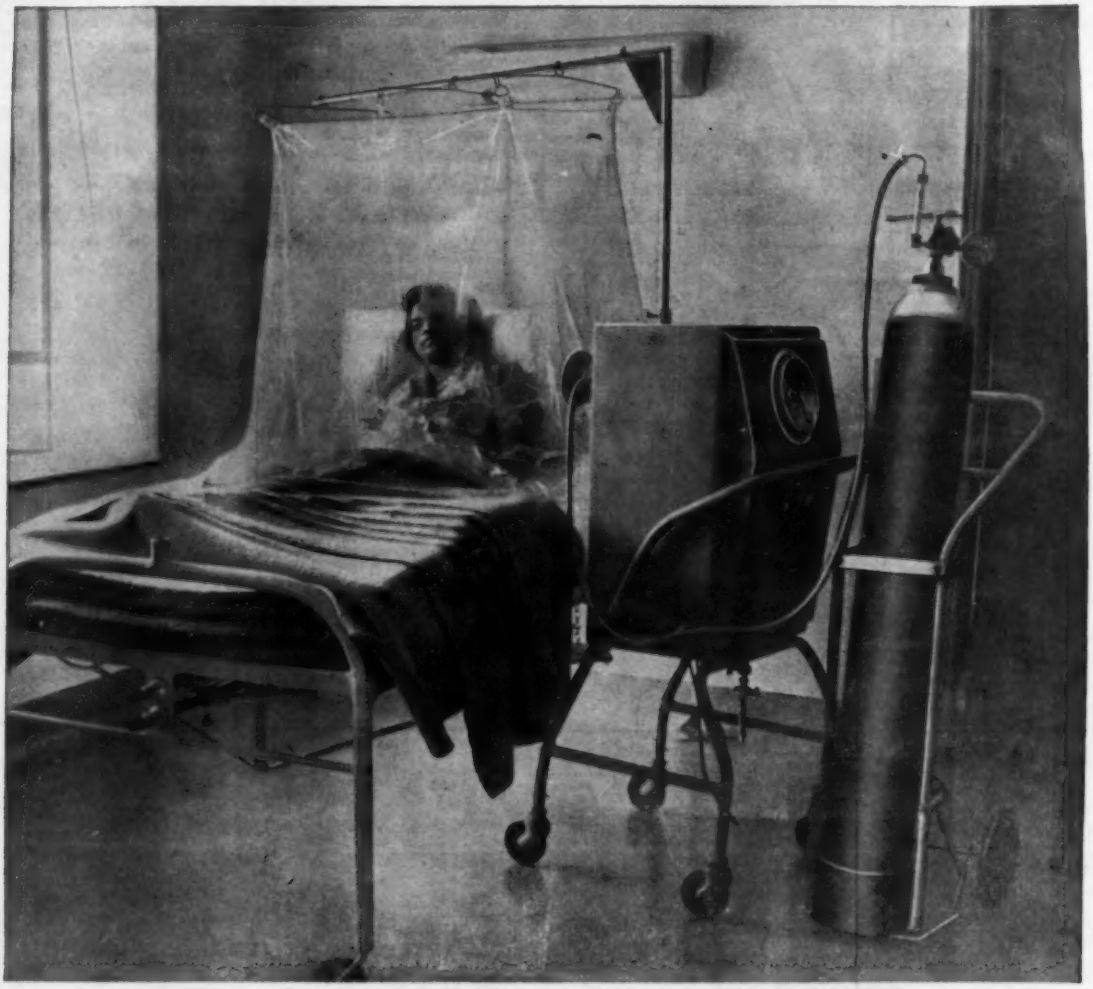

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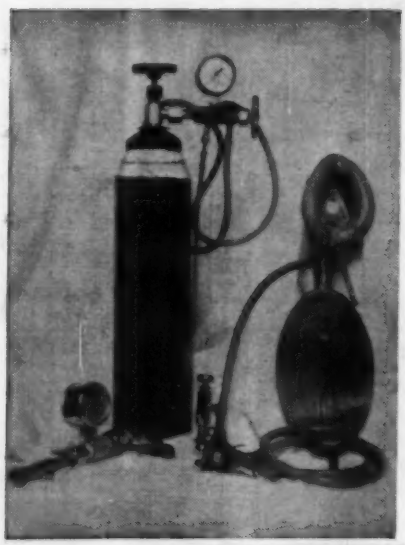

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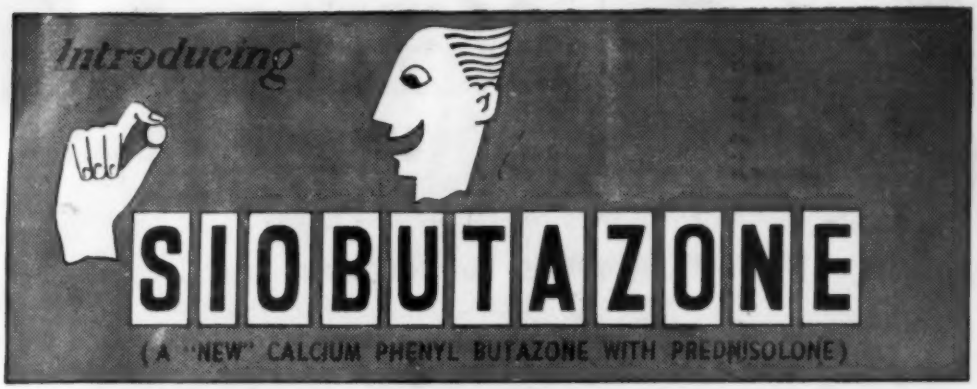

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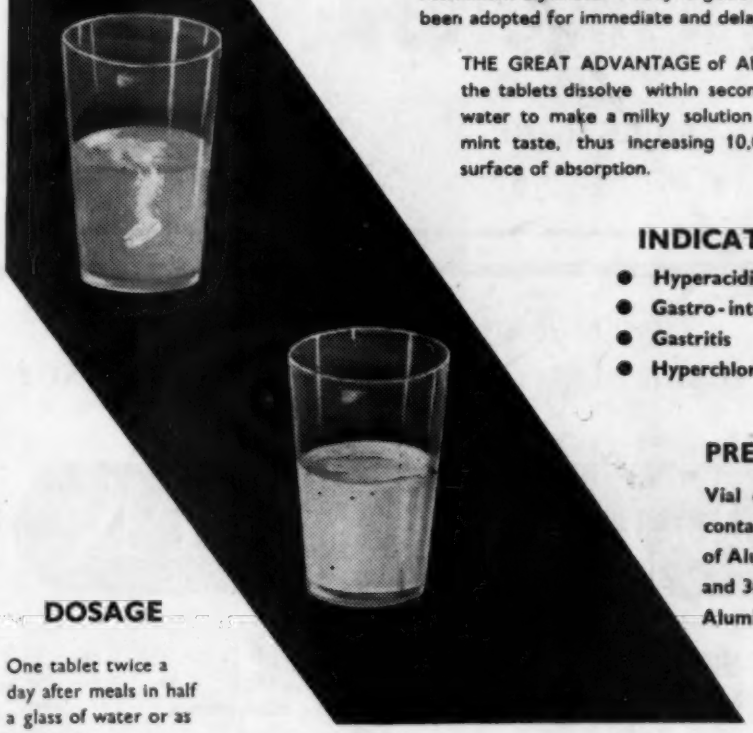

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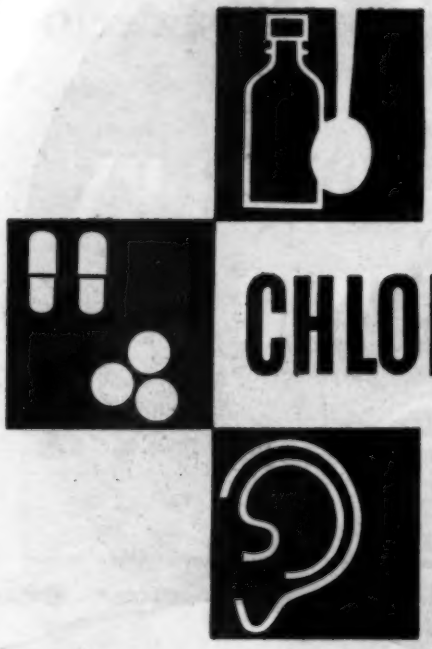

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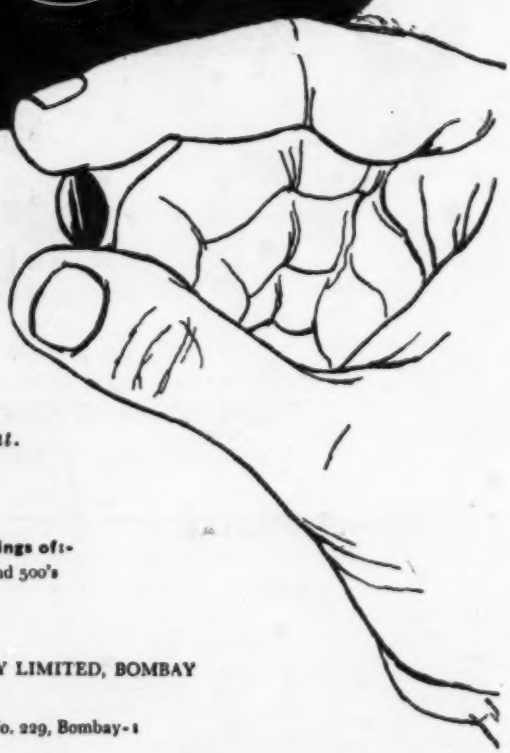

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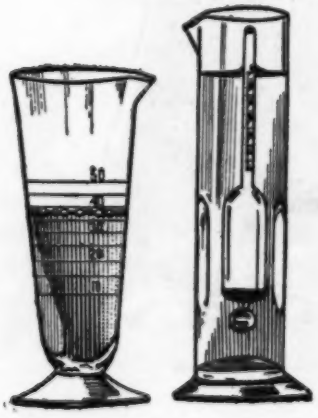

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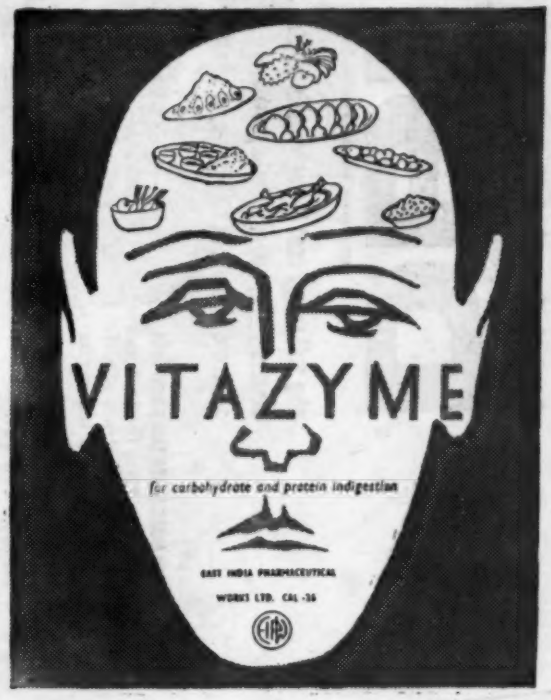

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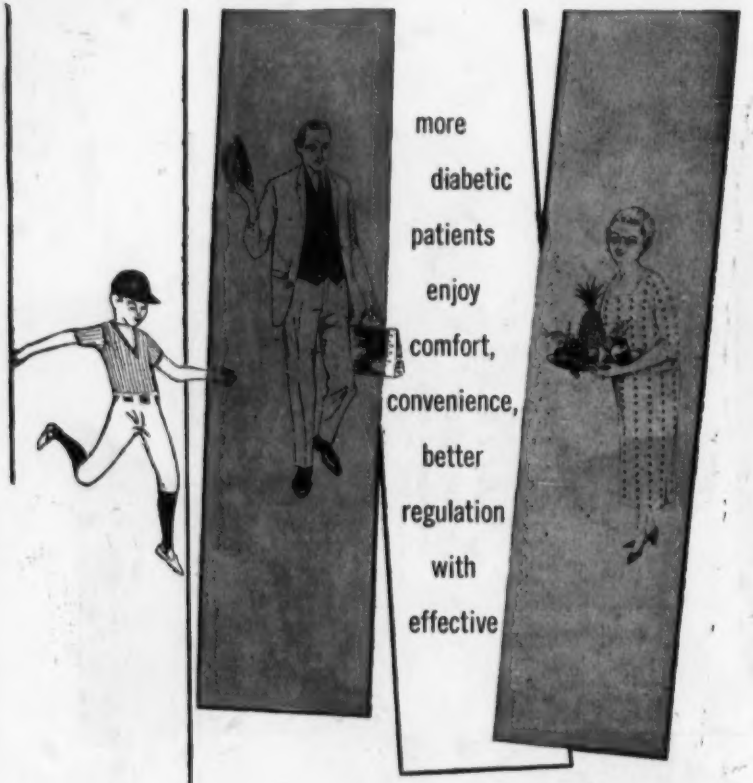

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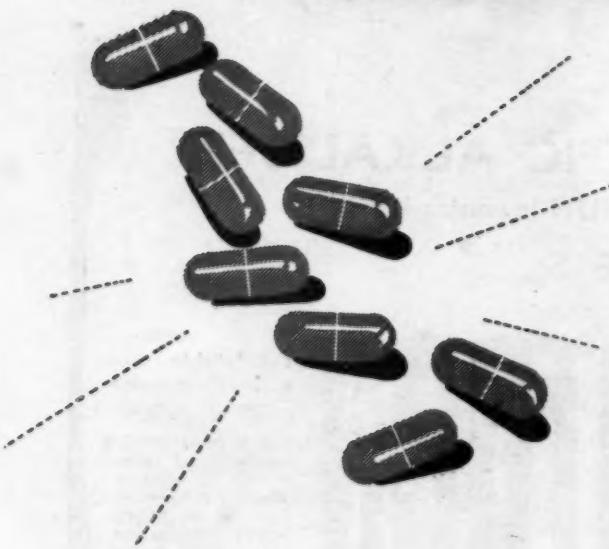

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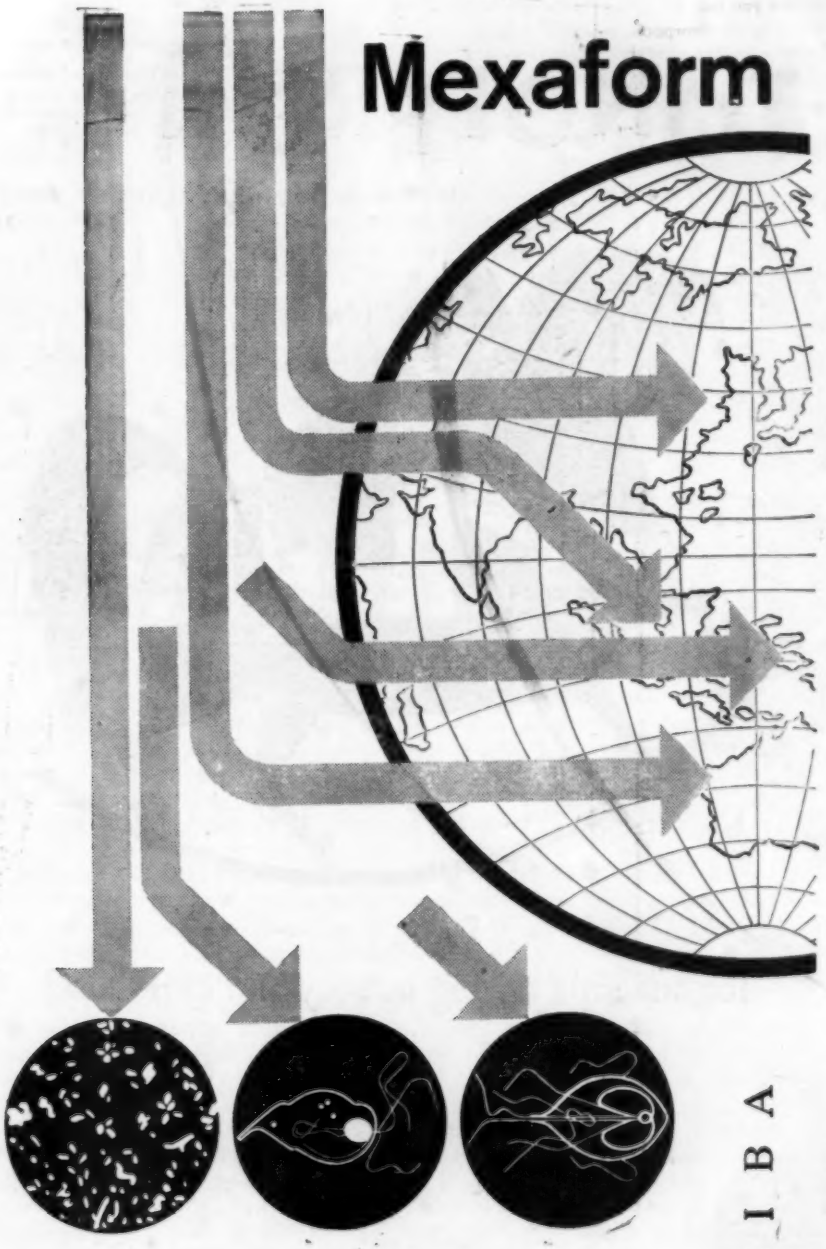

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ORIGINAL ARTICLES

OBSERVATIONS ON THE PRESENCE OF Rh SUBSTANCES IN BODY FLUIDS*

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Available literature on the presence of Rh substances in body fluids is scanty, conflicting and inconclusive. Wiener and Forer (1941) claimed that salivas are free from Rh substance. Levine and Katzin (1941) also failed to demonstrate Rh substance in saliva, sperm cells and seminal fluids. Boorman and Dodd (1943) were the first to have claimed the demonstration of a small amount of Rh substance in the saliva of Rh positive individuals. In a series of 51 Rh positive subjects, they reported evidence of secretion in 37 instances. They observed that the concentration of Rh substance in saliva was less than that in the tissues and that the Rh group specific substance was completely insoluble in water. Witebsky and Mohn (1945) could demonstrate the presence of Rh substances in the amniotic fluid of 80 per cent of Rh positive babies. In the gastric juice, Rh substances could be detected in 60 per cent of Rh positive individuals (Mohn and Witebsky, 1948). They could not demonstrate Rh substance in saliva. Walker and Baily (1956) could not, however, confirm the presence of Rh-D substance in amniotic fluids. They were unable to diminish appreciably the titre of anti-Rh (D) sera by absorption with liquor amni obtained from babies of different ABO and Rh groups.

In view of the above considerations, it was thought worthwhile to investigate the problem relating to the presence or absence of Rh substances in body fluids and tissues. Observations on samples of amniotic fluid, gastric juice, cerebrospinal fluid and saliva are recorded in the present communication.

MATERIAL AND METHODS

The following material was examined, viz., amniotic fluid 130, gastric juice 115, cerebrospinal fluid 85, saliva 30. Samples were collected both from Rh positive and negative individuals who were either normal or apparently normal subjects admitted for investigations or elective surgery. Amniotic fluid was obtained during normal delivery from patients admitted in the Eden Hospital, Calcutta. The details of collection and preservation of material have been described elsewhere (Roy, 1958). A part of the original fluid was lyophilised. The lyophilised material was dissolved in requisite amount of normal saline to yield a ten-fold concentration. The concentrated material was diluted in the following proportions 1 : 3, 1 : 6, 1 : 12, 1 : 24. A second part of the original fluid was dialysed in the cold and subsequently concentrated ten-fold. The concentrated dialysate containing little or no chloride was further diluted as above from 1 : 3 to 1 : 24. The

* Presented to the VIII International Congress of Blood Transfusion held in Tokyo, Japan, in September 1960.

following 12 samples were prepared and each one separately tested.

(*i*) *Original fluid* undiluted and diluted 1 : 3.
(*ii*) *Ten times concentrated fluid* undiluted and in 4 dilutions 1 :3 to 1 :24.
(*iii*) *Dialysed and ten times concentrated material* undiluted and in 4 dilutions 1 :3 to 1 :24.

All the samples were tested with saline acting anti-D, anti-C and anti-E sera by the agglutination inhibition technique of Witebsky and Mohn (1945). Care was taken to obtain a 3 plus (+ + +) reaction in control tubes ; with weaker control, the inhibition was largely non-specific.

The agglutination inhibition phenomenon was studied with reference to the effect of temperature, pH, storage and chloride content of the fluids tested.

Inoculation experiment—Amniotic, gastric and cerebrospinal fluids with significant anti-Rh inhibiting titre were inoculated. Undiluted original as also freeze dried material in concentrated solution were used for injection.

Normal healthy guinea-pigs, laboratory-bred with weight varying from 350 to 400 g. were employed. Guinea-pigs showing any natural antibody against human red cells were discarded. Technique of inoculation was similar to that of Murray (1952). Two injections were given to each animal. Blood of the animals was examined after 10 and 15 days of the inoculation.

Result

The rates of inhibition with different undiluted fluids are shown in Table 1.

Table 1—Showing Results of Agglutination Inhibition Tests with different Undiluted Fluids

Fluid	No. tested	No. showing partial or complete inhibitions
Cerebrospinal ...	85	73
Amniotic ...	130	83
Gastric ...	115	63
Salivary ...	30	5

Amniotic fluid—Some of the original amniotic fluid could inhibit, at least partially, the agglutinating activity of all types of anti-Rh sera on the respective Rh positive group 0 cells. This inhibition was not, however, related to the specific Rh antigen in the red cells of the babies concerned. In this series, fluid was examined from 7 cases of D negative, 24 C negative, and 105 E negative babies. Fluid of 5 D negative, 17 C negative and 69 E negative babies showed inhibition phenomenon almost similar to that obtained with D positive, C positive and E positive babies. When the amniotic fluid was diluted 1 :3, little or no inhibition was obtainable. From the comparative data on the concentrated material with or without previous dialysis, the chloride content of the fluid was found to influence the activity of the amniotic fluid. When the amniotic fluid was employed in ten-fold concentration, the rate of inhibition was increased. A similar ten-fold concentration of pre-dialysed material caused a decrease in the rate of inhibition.

When the pH of the fluid was lowered between 6 to 6·5, little or no inhibition was obtained even with the original undiluted amniotic fluid. Inhibition could, on the other hand, be increased by raising the pH to 9·5.

Heating of the fluid at 56°C for 15 minutes did not change the inhibition. Boiling, however, produced only slight decrease of inhibition.

Storage of the fluid at −20°C for 7 days did not affect the inhibition significantly.

Gastric juice—As with amniotic fluid, the inhibition was not always specifically related to the presence of Rh antigen in the red cells. With original samples, in 20 cases of D negative, 32 cases of C negative and 95 cases of E negative subjects, the inhibition was similar to that obtained with samples from positive subjects.

Removal of chloride from the fluid by the process of dialysis almost abolished the inhibition. The material when concentrated without previous dialysis showed an increased rate of inhibition, the pattern being the same both in positive and negative subjects. These findings suggest that the observed inhibition was not due to the presence of specific Rh antigen.

The effect of temperature and storage was similar to that observed with amniotic fluid.

Cerebrospinal fluid—With a 3 plus (+ + +) control, the original undiluted sample could inhibit the agglutination phenomenon in the majority of instances. The inhibition could not be specifically correlated with the Rh antigen in the blood cells. In the present series, the fluid was obtained from 3 cases of D negative, 13 cases of C negative and 70 cases of E negative subjects and in each instance the inhibition obtained was similar to that shown by Rh positive subjects.

Results of tests with different samples (dialysed and/or concentrated) showed that chloride content of the fluid played a significant role in the inhibitory activity of the cerebrospinal fluid. Lowering of pH to 6 or 6·5 appeared to abolish

the inhibition. The effect of temperature and storage was similar to that observed with amniotic fluid and gastric juice.

Saliva—Of the 30 samples of saliva tested, evidence of inhibition was obtained only in 5 samples of original fluid. The inhibition was noticed with salivas both from positive and negative subjects. Samples of concentrated material showed more frequent inhibitions. After dialysis, the inhibition was not obtained even with concentrated material.

Inoculation Experiment

Results of inoculation experiments are shown in Table 2. The inoculation of the different body fluids did not produce any specific anti-Rh antibody. In most of the instances no antibody whatsoever was produced. In 6 out of 28 animals, the agglutinins developed were active both against Rh positive and negative cells. These agglutinins could also be completely absorbed by Rh negative (cde) red cells.

Table 2—Showing Results of Inoculation Experiments on Guineapigs with Various Fluids in Original or Concentrated Form

Fluids	Original form		Concentrated form	
	No. inoculated	No. developing agglutinins	No. inoculated	No. developing agglutinins
Amniotic ...	8	1*	4	1*
Gastric ...	6	1*	4	1*
Cerebrospinal	6	2*	—	—

* Non-specific agglutinins.

Discussion

From the comparative data of agglutination inhibition tests carried out with different body fluids, it appears that the largest number of inhibitions of the action of anti-Rh sera on the respective Rh positive group 0 cells were obtained with cerebrospinal fluid. Inhibition obtained with amniotic fluid, though less striking and uniform, was also consistently obtained with a large number of samples. Inhibition with gastric juice was less frequent and less conspicuous and that with saliva was least frequent and barely demonstrable. It was further observed that in the majority of instances, the inhibition in general was obtainable with all the anti-Rh sera employed. This inhibiting phenomenon was not related to the presence of the specific Rh antigen in the red cells. The same type of inhibition was obtained with fluids from Rh positive and negative individuals.

In contrast to the strong inhibition obtained by the body fluids of A B O secretors on the corresponding antisera, the inhibiting activity with reference to Rh substance was extremely poor. The inhibition as observed in Rh system was not in any way related to the secretor status with reference to ABO group. The slight inhibition with anti-Rh sera was comparable to the inhibition shown by ABO non-secretors when their samples were tested for ABO substances (Wiener, 1943 ; Kabat, 1954).

Analysis of the results of the inhibition titres with undiluted, dialysed and concentrated material indicates that the inhibition observed was not specific. Concentration of chloride was to some extent responsible for the inhibition obtained.

Summary

Available literature on the presence of Rh substances in the body fluids is inconclusive. Samples of saliva, gastric juice, cerebrospinal fluid and amniotic fluid were examined for the presence of Rh substances. Agglutination inhibition technique and inoculation of the fluid into guineapigs failed to demonstrate any specific Rh activity in the fluids.

Acknowledgment

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EFFECT OF REPEATED BLOOD TRANSFUSIONS TO ANAEMIC RABBITS*

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Blood transfusion is a widely practised therapeutic measure in the treatment of anaemias, because it gives symptomatic relief. But there seems to be no unanimity regarding the size and frequency of transfusions which would confer optimal benefit. It appears likely that prolonged transfusions, by eliminating the potent stimulus of anoxia, could affect adversely the erythropoietic activity of the bone marrow. Robertson (1917) and Grant and Root (1952) observed a depression in the erythropoietic activity of the bone marrow in rabbits and rats, following a post-transfusional polycythaemia. Smith *et al* (1955) reported similar observations in human beings, suffering from haemolytic anaemia, after repeated transfusions.

The present experiment, conducted on rabbits rendered anaemic by repeated blood letting, aims at investigating (a) the difference in the period of recovery between animals receiving blood transfusions and those receiving none, (b) the relative efficiency of small and frequent blood transfusions as compared to large and less frequent transfusions, in the correction of anaemia and (c) the relative effects of the two types of transfusions on the erythropoietic activity of the bone marrow, after a period of 12 weeks.

Material and Method

Fifteen adult, healthy rabbits, weighing about 2,000 g. each, were made anaemic by repeated bleedings and divided into 3 groups, A, B and C. Groups A and B, the experimental groups, consisted of 6 animals each, and group C consisted of 3 animals serving as the control. A reduction in the red cell count by at least 1 million per c.mm. and of haemoglobin by at least 2 g. per cent were the criteria employed in deciding that an animal was sufficiently anaemic for the purpose of this experiment. All the animals were kept in separate cages and fed on standard laboratory diet.

Animals of group A received 2 ml. of rabbit blood daily for 6 days in a week, whilst animals of group B received transfusions of 6 ml. each, twice a week and the control group C receiving no transfusions. In all the cases, blood for transfusion was obtained from the laboratory stock of healthy rabbits by cardiac puncture and tested for compatibility with the recipient's blood by direct matching. The transfusions were effected by injection of the citrated blood into the marginal vein of the rabbit. Haematological values (red cell count, haemoglobin, P.C.V., M.C.V., M.C.H. and M.C.H.C.) were estimated by standard laboratory techniques in each of the animals once a week ensuring that in the case of the experimental animals this was done before the transfusion if it fell due on that particular day. The bone marrow of each of the animals was collected by puncturing the upper end of the tibia at the level of the tibial tuberosity (the technique described by Rangam *et al*, 1960) and studied at the commencement of the experiment as well as after 12 weeks.

Results

The haematological values obtained at weekly intervals in the group of animals receiving successive daily transfusions of 2 ml. each are presented in Table 1. The state of anaemia in this group of animals was corrected, i.e., the haematological levels were restored within a period of 2-3 weeks during which period 36 ml. of blood had been transfused. Later, between the 10th and the 11th week, i.e., after transfusing 120 to 132 ml. of blood, a decline in the red cell count and haemoglobin values commenced and in spite of the continuance of the transfusions, it persisted.

In group B a restoration of the basal pre-anaemic haematological values was achieved within one week, i.e., after transfusion of 12 ml. of blood. Later, the red cell count started declining after 8 weeks, i.e., after transfusing 96 ml. of blood. The haemoglobin values fluctuated but a significant drop was registered after 12 weeks (Table 2).

The weekly haematological values in the control group C of animals receiving no transfusion at all are recorded in Table 3. In this group of animals, the anaemia corrected itself within 2 to 3 weeks and no further decline in haematological values ever occurred afterwards during the entire period of observation.

The bone marrow smears of all the animals in all the groups showed active erythroid reaction at the commencement of the experiment. At the

*Presented at the 10th annual conference of the Indian Association of Pathologists, Poona, December 1959.

† Since deceased.

TABLE 1—SHOWING THE AVERAGE WEEKLY HAEMATOLOGICAL VALUES IN RABBITS OF GROUP A, RECEIVING DAILY SUCCESSIVE TRANSFUSIONS OF 2 ML. EACH

Investigation	Basal value	Anaemic value	Period in weeks (wk.) and number of transfusions (Tr.)											
			1 wk. 6 Tr.	2 wk. 12 Tr.	3 wk. 18 Tr.	4 wk. 24 Tr.	5 wk. 30 Tr.	6 wk. 36 Tr.	7 wk. 42 Tr.	8 wk. 48 Tr.	9 wk. 54 Tr.	10 wk. 60 Tr.	11 wk. 66 Tr.	12 wk. 72 Tr.
R.B.C. (mill./c.mm.)	... 5·98±0·4	4·75	5·50	5·69	5·74	5·99	5·85	5·96	5·95	6·01	5·97	6·00	5·41	5·35
Haemoglobin (g. %)	... 11·00±0·55	8·50	9·50	10·00	10·50	11·00	11·00	10·50	10·50	10·50	10·50	10·00	10·00	10·00
P.C.V. (%)	... 44·33±2·94	37·16	41·40	42·70	42·85	44·20	43·33	42·50	42·00	43·00	43·00	44·00	41·00	40·00
M.C.V. (c.μ)	... 75·41±5·30	72·05	74·34	74·97	74·67	75·47	74·93	73·80	73·50	73·50	73·60	72·80	72·50	70·40
M.C.H. ($\gamma\gamma$ g.)	... 19·22±2·60	17·12	17·64	18·77	19·05	19·37	18·25	18·45	18·10	18·25	18·20	17·50	17·15	17·50
M.C.H.C. (%)	... 25·68±0·9	22·90	23·44	24·63	24·30	25·60	25·40	25·11	25·05	23·81	24·25	23·33	23·22	23·00

TABLE 2—SHOWING THE AVERAGE HAEMATOLOGICAL VALUES IN RABBITS OF GROUP B, RECEIVING BIWEEKLY TRANSFUSIONS OF 6 ML. EACH

Investigation	Basal value	Anaemic value	Period in weeks (wk.) and number of transfusions (Tr.)											
			1 wk. 2 Tr.	2 wk. 4 Tr.	3 wk. 6 Tr.	4 wk. 8 Tr.	5 wk. 10 Tr.	6 wk. 12 Tr.	7 wk. 14 Tr.	8 wk. 16 Tr.	9 wk. 18 Tr.	10 wk. 20 Tr.	11 wk. 22 Tr.	12 wk. 24 Tr.
R.B.C. (mill./c.mm.)	... 5·67±0·53	4·41	5·70	5·96	5·84	5·90	6·10	6·00	5·60	5·06	5·15	4·58	4·77	4·50
Haemoglobin (g. %)	...11·83±1·03	8·40	11·50	10·75	10·75	11·25	12·00	11·20	10·80	11·00	11·50	11·00	11·25	10·00
P.C.V. (%)	...43·99±2·2	36·99	42·00	44·00	43·00	43·25	46·66	44·20	41·80	43·00	42·00	41·00	40·00	38·50
M.C.V. (c.μ)	...74·93±5·10	74·06	73·60	74·43	73·80	72·45	25·60	73·80	74·90	70·10	70·50	73·50	73·10	73·00
M.C.H. ($\gamma\gamma$ g.)	...19·11±1·59	17·76	17·98	19·23	18·65	18·45	19·35	18·60	19·30	21·40	21·00	21·50	20·75	20·49
M.C.H.C. (%)	...24·90±2·20	22·58	22·86	24·87	23·96	24·40	26·25	25·32	25·82	25·69	26·80	25·20	26·70	25·70

TABLE 3—SHOWING THE AVERAGE WEEKLY HAEMATOLOGICAL VALUES IN THE ANIMALS OF GROUP C, RECEIVING NO TRANSFUSIONS

Investigation	Basal value	Anaemic value	Period in weeks (wk.)										
			1 wk.	2 wk.	3 wk.	4 wk.	5 wk.	6 wk.	7 wk.	8 wk.	9 wk.	10 wk.	11 wk.	12 wk.
R.B.C. (mill./c.mm.)	... 5·69±0·97	4·23	4·45	4·75	4·92	5·29	5·63	5·66	5·93	5·95	5·95	5·96	6·10	6·01
Haemoglobin (g. %)	... 9·75±0·8	7·75	8·25	8·50	8·75	9·00	9·50	9·75	10·00	10·00	10·50	10·50	11·00	11·00
P.C.V. (%)	... 40·50±2·6	32·50	33·50	35·50	37·00	39·50	41·00	43·00	44·50	44·00	45·00	44·50	45·00	45·00
M.C.V. (c.μ)	... 74·25±2·8	70·62	72·30	74·78	74·16	74·67	74·05	74·00	75·15	74·41	75·70	75·18	75·68	75·08
M.C.H. ($\gamma\gamma$ g.)	... 18·10±2·1	17·44	17·60	17·98	17·77	18·10	18·15	18·23	17·90	17·90	17·67	17·63	17·16	17·96
M.C.H.C. (%)	... 24·65±0·5	24·01	24·70	24·62	23·65	22·80	23·18	23·67	23·74	23·74	24·89	24·66	24·89	24·75

end of 12 weeks, the marrow of both the experimental groups (A and B) appeared less cellular with fewer erythroid cells than the control group, and the change was more conspicuous in group B than in group A (Table 4).

DISCUSSION

Spontaneous correction of anaemia following blood loss, if adequate supply of iron and other maturation factors is ensured, is well known. This has also been observed in this experiment, viz., in the control group of rabbits receiving no transfusions. It is apparent however, that the correction can be achieved more speedily if transfusions of homologous blood are given.

In regard to the question of efficacy of small and frequent transfusions compared to that of large and less frequent ones, it appears that the latter brings about the desired correction in a shorter time and with the use of a smaller total quantity of blood. Boycott and Douglas (1910) and later Boycott and Oakley (1933) observed that rabbits learn to destroy transfused red cells and that with every successive transfusion, the destruction is more rapid. This might provide an explanation for the correction of anaemia achieved

TABLE 4—SHOWING THE M : E RATIO OF BONE MARROW IN THE THREE GROUPS OF ANIMALS, BEFORE AND AFTER THE BLOOD TRANSFUSIONS

Groups of animals	No. of animals	M : E ratio of bone marrow	
		In anaemic animals before starting transfusion	After giving transfusions at the conclusion of experiment
A	1	1 :1·04	1 :0·8
	2	1 :1·05	1 :0·85
	3	1 :0·91	1 :0·72
	4	1 :0·90	1 :0·80
	5	1 :0·90	1 :0·81
	6	1 :0·92	1 :0·75
B	1	1 :1·19	1 :0·64
	2	1 :0·93	1 :0·50
	3	1 :0·99	1 :0·60
	4	1 :0·92	1 :0·54
	5	1 :0·91	1 :0·54
	6	1 :0·98	1 :0·50
C	1	1 :1·04	1 :1·09
	2	1 :1·01	1 :1·93
	3	1 :1·21	1 :1·25

with a smaller quantity of blood when the transfusions were less frequent. The absence of polycythaemia after the correction of anaemia in our study in the face of continuing transfusions would appear to confirm that transfused red cells were being lysed with great rapidity.

It is also apparent that if transfusions are continued over long periods, anaemia reappears after correction at an earlier stage, a finding which corroborates the observations of previous workers like Robertson (1917) Krumbhaar and Chanutin (1922), Birkhill *et al* (1951) and Elmlinger *et al* (1952) who produced anaemia in normal animals by maintaining them in a state of polycythaemia by repeated transfusions. They suggested that sustained polycythaemia induces a hypoplasia of marrow by eliminating the stimulus of anoxia.

CONCLUSION

From the foregoing, although there is no certainty that the changes in human beings are bound to be identical with those seen in rabbits, it seems reasonable to suggest that if transfusions are at all to be given, larger transfusions spaced over longer intervals should be preferred to correct anaemia and that if the type of anaemia is such as to demand repeated transfusions over prolonged periods, smaller and frequent transfusions may be preferred, when once the correction of anaemia has been achieved.

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DIET IN WESTERN UTTAR PRADESH

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Dietary surveys have been carried out in different parts of India from time to time to assess the dietary habits and nutritional status of the people. Mitra (1951), on behalf of the Nutritional Advisory Committee of the Indian Council of Medical Research published the results of 843 such surveys during the fourteen-year period 1935-1948. He observed that many of these surveys had not been done on a planned and co-ordinated basis.

Out of the 843 dietary surveys carried out before 1948, only two surveys had been done in Uttar Pradesh covering 40 families of the hilly district of Tehri-Garhwal (Mitra 1951). Between 1949 to 1957, dietary surveys were undertaken on a more systematic basis in different physiographical regions of Uttar Pradesh. Govil *et al* (1958) collected data of all the dietary surveys carried out in the State during this period, but practically all these surveys were done in eastern districts of Uttar Pradesh. They analysed the dietary habits of 3,451 persons including 596 school boys living in boarding houses, mainly from the rural areas.

During the last four-year period from August 1956 to August 1960 we carried out dietary survey amongst different socio-economic groups of general population in western Uttar Pradesh as part of field studies in the epidemiology of coronary heart disease. Our observations on the relationship of dietary fats and serum lipids have been reported earlier (Mathur *et al*, 1959). It is the purpose of this paper to analyse in detail the data on the dietary habits of our population. Such a study will not only contribute in finding out the dietary essential contents of the food intake, their deviations from the recommended allowances, the nutritional status of the people, and help planning of the future diet on the basis of energy and nutrient requirements, but will also throw light in understanding their relationship to diseases which are known to be closely associated with diet.

Material and Methods

2,014 unselected persons above the age of 20 years including 1,735 males and 279 females have been studied. These cases were drawn from different socio-economic groups of the population of Agra and neighbouring districts of western Uttar Pradesh.

These cases were divided into high, middle and low socio-economic groups depending on their income, status in society, vocation and education (Mathur *et al*, 1959 and Mathur, 1960). 385 males and 82 females belonged to high socio-economic group (Group I), 561 males and 110 females to middle socio-economic (Group II) and 789 males and 87 females to low socio-economic group (Group III). The males of group III were further subdivided into (i) skilled workers—323, (ii) manual workers—321 and (iii) agricultural workers—145.

Of the various methods of diet survey recommended by the Indian Council of Medical Research (1951) such as oral questionnaire method, checking of stock by inventory, weighment of raw food and survey of cooked foods, oral questionnaire method was chosen for the present study as we found it to be as reliable as the weighment method and less time consuming and more practical in a survey work of this type. This has been further confirmed by Padmavati *et al* (1958) and Pasricha (1959).

Each individual was interrogated for his intake of different food articles. To facilitate the individuals in answering to our queries and to increase the accuracy of the answers, standardised utensils of graded size commonly used in this part of the country were displayed. Many a time the same question was asked in a different form in order to have the correct information. From these data the consumption of proximate principles and calories were calculated according to the values given by Aykroyd *et al* (1956).

The per capita daily consumption of different food articles and protein, fat, carbohydrate and calorie intake were calculated from the accumulated data for each socio-economic group.

Consumption of Food Articles

Per capita per day consumption of food articles in the population studied is given in Table 1.

Cereals—Cereals are mostly consumed in the form of flour of wheat, millets and barley. Rice forms only a small part of the total cereal intake in this part of the country. Among males, agricultural workers (18·5 oz. per day) and in females those belonging to low socio-economic group (8·1 oz. per day) consume the largest amounts of cereals. With the rising economic status the consumption of cereals decreases, reaching the minimum values of 9·8 oz. and 7·0 oz. per day in high socio-economic group males and females respectively.

Pulses—Among males, skilled workers consume the largest amount of pulses (4·7 oz. per day), while the least amount is taken by persons of high socio-economic group. The intake of pulses in females is much lower than in males, and does not vary significantly in different groups. The larger figures of consumption of pulses for skilled and manual workers are due to the fact that they also use Bengal gram in the form of flour.

Vegetables—The average intake of vegetables ranges from 5·4 to 8·7 oz. per day in males and 5·5 to 8·0 oz. per day in females. Poor people consume less vegetables than economically better placed persons.

Sugar and jaggery—The average intake of sugar and jaggery varies from 0·8 to 1·7 oz. per day in males and 0·8 to 1·3 oz. per day in females.

Fruits—The amount of fruits in diet depends upon the economic status of the person. Those belonging to high socio-economic group consume the most (3 oz. per day by males and 4 oz. per day by females), while the reverse is true for those low in socio-economic status (0·1 oz. per day by males and 0·2 oz. per day by females).

Milk and milk products—Per capita daily consumption of milk as such and in the form of milk products such as curd, *paneer* and *khoya* is found to be intimately related to the economic status of the persons. Males and females of high socio-economic group consume the highest amount of milk and milk products (14·7 oz. and 9·6 oz. per day respectively) and those belonging to low socio-

TABLE 1—SHOWING AVERAGE PER CAPITA DAILY CONSUMPTION OF FOOD ARTICLES (IN OZ.)

Food articles	Males					Females		
			Group III					
	Group I	Group II	Skilled workers	Manual workers	Agricultural workers	Group I	Group II	Group III
Cereals :								
Flour	8·6	11·7	14·8	14·0	18·2	5·6	6·8	7·2
Rice	0·8	0·6	0·5	0·5	0·3	0·8	0·8	0·9
Bread	0·4	0·1	0·1	0·1	—	0·6	0·1	—
Pulses	1·3	1·5	1·6	1·4	1·6	0·9	1·0	1·0
Bengal gram flour ...	0·1	0·2	3·1	1·9	0·5	—	—	0·2
Vegetables	8·7	7·7	5·4	5·8	6·3	8·0	6·4	5·5
Fruits	3·0	1·4	0·2	0·1	0·1	4·0	0·7	0·2
Sugar & jaggery ...	1·7	1·4	1·1	0·8	1·1	1·3	0·9	0·8
Milk & milk products	14·7	10·4	6·5	4·4	6·4	9·6	5·4	4·5
Fats and oils :								
Butter	0·2	0·1	—	—	—	0·2	—	—
Ghee	1·6	1·3	0·5	0·4	0·5	1·1	0·7	0·4
Hydrogenated vegetable fat ...	0·3	0·3	0·1	0·1	—	0·4	0·3	0·2
Oils	0·2	0·2	0·3	0·2	0·4	0·2	0·2	0·3
Eggs	0·3	—	—	—	—	0·1	—	—
Meat	0·8	0·2	0·3	0·2	0·3	0·2	—	—

economic group consume the least (4·4 oz. per day by males and 4·5 oz per day by females).

Fats and oils—Fat consumption is highest in high socio-economic groups (2·3 oz. per day by males and 1·9 oz. per day by females) and lowest in low socio-economic group (0·7 oz per day by manual workers and 0·9 oz. per day by females of low socio-economic group). Females consume less than the males in each socio-economic group. Economically better persons take most of the fats as butter or ghee ; in poor persons oils and hydrogenated vegetable fats replace butter and ghee.

Eggs and meat—Eggs are taken only by persons belonging to the high socio-economic group. The consumption of meat varies from 0·2 oz. to 0·8 oz. per day. Females of middle and low socio-economic groups do not take meat or eggs.

PROXIMATE PRINCIPLES AND CALORIE CONSUMPTION

The intakes of different proximate principles and calories in the population studied are given in Table 2.

Proteins—Among males the protein intake is much higher in low socio-economic group compared to high and middle socio-economic groups ; the highest figure is observed in skilled workers ($92·0 \pm 34·5$ g. per day). In females the protein intake does not differ significantly with socio-economic status but on the whole it is far less than the protein intake in males. However, both males and females in high socio-economic group derive a large percentage of their protein ($27·1 \pm 8·3\%$ and $21·2 \pm 10·6\%$ respectively) from animal source. In low income groups vegetable protein forms a larger part of the protein intake. In both sexes the percentage contribution of protein to the total calories is maximum in the low socio-economic group and minimum in the high socio-economic group.

Fats—Both in males and females of high socio-economic group the diet contains the highest amount of fats ($86·1 \pm 25·2$ g. and $65·5 \pm 28·0$ g. per day respectively) ; the lowest figures are observed in low socio-economic group ($34·6 \pm 15·3$ g. in male manual workers and $35·3 \pm 14·9$ g. in females). Consistent with these observations is the finding that percentage contribution by fat to the total calories is highest in high socio-economic group both in males ($32·5 \pm 8·6\%$) and females ($34·0 \pm 4·4\%$) and lowest in low socio-economic group both in males ($15·0 \pm 6·5\%$ in agricultural workers) and females ($22·6 \pm 8·7\%$).

On considering the type of fat consumed (Table 3) it is observed that in persons of high socio-economic group larger percentage of fat is consumed as animal fat ($77·4 \pm 27·6\%$ in males and $70·0 \pm 16·0\%$ in females) and less as vegetable fats ($12·9 \pm 7·8\%$ in males and $13·7 \pm 8·2\%$ in females). The consumption of animal fat fell with the socio-economic status, with the result that the percent-

TABLE 2—SHOWING INTAKE OF PROXIMATE PRINCIPLES AND CALORIES IN DIFFERENT SOCIO-ECONOMIC GROUPS

Sex	Socio-economic group	Protein g.	Animal protein %	Fat g.	Carbohydrate g.	Calories	Protein calories %	Fat calories %
Males :								
	High	63·3±20·5 (30·7—107)	27·1± 8·3 (3·0—50·4)	86·1±25·2 (27·9—140·7)	329·3±114 (166—511)	2,350±440 (1,107—3,426)	10·8±3·5 (6·2—14)	32·5± 8·6 (13—45)
	Middle	65·9±24·2 (26·1—129)	15·7± 7·6 (1—44)	69·8±30·1 (20·4—112)	357·8±145 (189—544)	2,321±406 (1,160—3,405)	11·4±2·8 (7·9—14·8)	27·2±10·8 (8·6—42)
	Low							
	Skilled workers ...	92·0±34·5 (31·4—161)	8·2± 3·4 (0—39·9)	45·4±20·6 (8·3—108)	450±160 (208—683)	2,570±537 (1,235—4,035)	14·3±2·4 (9·7—19·1)	16·0±11·4 (3·6—33·5)
	Manual workers ...	76·7±20·4 (32·7—142)	5·8± 2·1 (0—33·9)	34·6±15·3 (11·6—76·7)	400±90·6 (230—574)	2,220±389 (1,192—3,378)	13·7±2·4 (10·1—18·4)	16·8± 7·4 (4·4—30·7)
	Agricultural workers	84·6±21·6 (36·7—136)	7·2± 3·6 (0—29·1)	43·3±18·6 (12·5—112)	468±85·9 (215—765)	2,608±296 (1,178—4,192)	13·0±2·5 (9·3—16·3)	15·0± 6·5 (4·4—31·4)
Females :								
	High	42·1±11·7 (21—65·8)	21·2±10·6 (0·9—43·5)	65·5±28·0 (22·8—130)	238±66·2 (123—338)	1,713± 52 (966—2,970)	9·8±2·3 (6·6—12·6)	34·0±14·4 (10·3—46·4)
	Middle	39·0± 8·5 (18·6—75)	11·9± 6·7 (0—38·8)	45·7±19·1 (13—126·9)	225±46·6 (141—339)	1,468± 43 (862—2,644)	10·9±3·1 (7—14·0)	27·9± 7·6 (13·2—43·7)
	Low	40·0± 8·2 (17·6—75·6)	10·6± 7·4 (0—37)	35·3±14·9 (10·5—76)	229±50·3 (114—408)	1,401±60·0 (862—2,502)	11·6±1·9 (8·8—15·6)	22·6± 8·7 (4·7—42·1)

TABLE 3—SHOWING INTAKE OF TOTAL AND OF DIFFERENT TYPES OF DIETARY FATS

Socio-economic group	Total fat g./day	Animal fats %	Hydrogenated vegetable fats %	Vegetable fats %
Males :				
I	86·1±25·2 (27·9—140·7)	77·4±27·6 (5·8—97·4)	9·7± 6·3 (0—80·2)	12·9± 7·8 (2·6—67)
II	69·8±30·1 (20·4—112·0)	70·0±29·5 (5·8—96·6)	12·0± 5·9 (0—81·1)	18·0±11·2 (3·4—94·2)
III				
Skilled workers	45·4±20·6 (8·3—108)	48·0±24·6 (0—95·3)	5·4± 4·3 (0—60·5)	46·6±15·6 (4·7—100)
Manual workers	34·6±15·3 (11·6—76·7)	45·8±32·9 (0—94·7)	8·6± 4·1 (0—62·3)	45·6±26·8 (5·3—100)
Agricultural workers ...	43·3±18·6 (12·5—112·2)	48·8±28·4 (0—88·0)	— —	51·2±16·8 (12—100)
Females :				
I	65·5±28·0 (22·8—130·2)	70·0±16·0 (11—97·9)	16·3±14·2 (0—55·8)	13·7± 8·2 (3—61·7)
II	45·7±19·1 (13—126·9)	58·9±27·5 (4—0·35)	18·8± 7·5 (0—86·4)	22·3±16·7 (3·6—94·5)
III	35·3±14·9 (10·5—76·1)	46·5±31·8 (0—95·0)	16·4±10·6 (0—82·0)	37·1±25·7 (4·1—100)

age of animal fat decreased to 45·8±32·9% in manual workers and 46·5±31·8% in females of low socio-economic group and that of vegetable fat increased to 51·2±16·8% in agricultural workers and 37·1±25·7% in group III females.

Carbohydrates—Among males, those belonging to low socio-economic group consumed more carbohydrates than those of middle and high socio-economic groups. The highest figures are obtained in agricultural workers (468·5±85·9 g. per day) and lowest in high socio-economic group (329·3±114·3 g. per day). In females the consumption of carbohydrates does not differ much with socio-economic status.

Calories—In males the calorie intake of agricultural workers is the highest (2,608±296 calories per day) followed by skilled workers, persons belonging to group I and II and manual workers

TABLE 4—SHOWING PERCENTAGE DEVIATION OF FOOD INTAKE FROM THE RECOMMENDED ALLOWANCES

Food articles	Males					Females		
			Group III					
	Group I	Group II	Skilled workers	Manual workers	Agricultural workers	Group I	Group II	Group III
Cereals	−30·0	− 11·2	− 10·0	+ 4·3	+ 32·1	−37·4	− 31·2	− 27·8
Pulses	−53·3	− 43·3	+ 56·7	+ 10·0	− 30·0	−62·5	− 58·3	− 50·0
Vegetables	−13·0	− 23·0	− 46·0	− 42·0	− 37·0	—	− 20·0	− 31·2
Fruits	—	− 53·3	− 93·3	− 96·7	− 96·7	+66·6	− 70·8	− 91·6
Sugar and jaggery ...	−15·0	− 30·0	− 45·0	− 60·0	− 45·0	−18·7	− 43·7	− 50·0
Milk and milk products	+47·0	+ 4·0	− 35·0	− 56·0	− 36·0	+20·0	− 32·5	− 43·7
Fats and oils ...	+15·0	− 5·0	− 55·0	− 65·0	− 55·0	+18·7	− 25·0	− 43·7
Eggs	−50·0	−100	−100	−100	−100	−90·0	−100	−100
Meat	−73·3	− 93·3	− 90·0	− 93·3	− 90·0	−91·6	−100	−100

in decreasing order. The intake of manual workers is 2,220±389 calories per day.

In females the pattern of calorie consumption is different from that in males. The caloric intake decreases with the socio-economic status, from 1,713±52 calories per day in high socio-economic group to 1,401±60 calories per day in low socio-economic group.

COMMENTS

The present survey shows that the diets of the population studied do not fulfil the criteria of a balanced diet. The diet in most of the groups is grossly deficient in pulses, vegetables, fruits, milk and milk products, fats and oils, eggs and meat. Similar inadequacy in leafy vegetables, milk and milk products, meat, fish, eggs, fruits and nuts were reported by Govil *et al* (1958) in the diets of agricultural workers in fifteen other districts of Uttar Pradesh. Per capita daily consumption of all the articles of food is less in our population than the recommended allowances (Table 4) except that of cereals in manual and agricultural workers, of pulses in skilled and manual workers, fruits, milk and milk products and fats in both sexes belonging to high socio-economic groups.

A similar state of nutrition becomes evident when the intake of proximate principles and calorie in our population is compared with the estimated intake (Table 5).

The diet in males of high socio-economic group is nearest to the ideal intake while in others much deviation is present from the desirable.

All persons of low socio-economic group and also females of middle socio-economic group subsist on low caloric diets, while males and females of high socio-economic group and males of middle

TABLE 5—SHOWING PERCENTAGE DEVIATION OF PROXIMATE PRINCIPLES AND CALORIES FROM ESTIMATED ALLOWANCES

Sex	Socio-economic group	Protein g.	Fat g.	Carbo-hydrate g.	Calories
Males :					
	High ...	− 6·0	− 4·3	+ 5·6	—
	Middle ...	− 1·4	−22·4	+13·5	− 0·3
	Low				
	Skilled workers	+43·5	−49·5	− 9·2	− 5·4
	Manual ,,	+17·3	−61·5	− 2·9	−18·2
	Agricultural ,,	+32·6	−51·8	−31·8	−31·0
Females :					
	High ...	−21·0	−19·1	− 1·6	− 4·6
	Middle ...	−26·6	−43·6	− 7·0	−23·1
	Low ...	−31·8	−56·4	+ 7·2	−23·0

socio-economic group take enough calories. The deficiency in calories is maximum in agricultural workers. The diet of agricultural workers in 12 of the other 15 districts of Uttar Pradesh (Govil *et al*, 1958) is richer in calories as compared to that of our agricultural population.

Protein intake in males of low socio-economic group exceeded the recommended allowance. This is due to the fact that these people eat larger amount of Bengal gram. The diets of females are inadequate in protein. To meet the criteria of good nutrition at least 20 per cent of the total protein should be obtained from animal source in order to have all the essential amino acids. Our observations show that the percentage of animal protein is adequate only in high socio-economic group ; in the remaining groups it is inadequate in amount and is replaced by vegetable proteins. The inadequacy in animal protein may not be unconducive to health as cereals in proper propor-

tion may provide protein adequate in quality (Patwardhan, 1960). It can be said therefore, that the diets of males in our population are not inadequate in quality and quantity in respect of protein.

The total dietary fats are inadequate in the diets of all except the males of high socio-economic group. The diets of manual workers and females of group III are the poorest in this respect. This fairly reflects the economic status of the persons. Fats being costly articles of food, persons in middle and low socio-economic groups with a slender income cannot afford to eat enough fat. The lowest figures of fat consumption reported by Govil *et al* (1958) in Mirzapur, Kanpur, Lucknow, Bahraich, Gonda, Ghazipur, and Deoria would be due to still poorer economic conditions prevailing among agricultural workers in eastern districts of Uttar Pradesh.

Significant deviation in carbohydrate intake is present in agricultural workers and this is in keeping with the poorest calorific value of their diets in the whole population.

Summary

A survey has been carried out to investigate the dietary habits of population in western Uttar Pradesh. The data on dietary intake on 2,014 unselected persons consisting of 1,735 males and 279 females collected by oral questionnaire method have been analysed to find out the adequacy of diet in this population both in terms of food articles and nutrients.

Deviation of dietary intake in this population from recommended allowances has been discussed. The nutritional status in western Uttar Pradesh has been compared with the figures available for other parts of the State.

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A STUDY OF INTRAPULMONARY AND INTRATHORACIC PRESSURES IN NORMAL HEALTHY SUBJECTS

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Introduction

A large number of physiological tests has been developed for quantitative and qualitative evaluation of pulmonary function in health and their applications in various cardiopulmonary diseases. Successful attempts have also been made to measure intrathoracic pressure in healthy men by determining intrapleural pressure. Its significance has been studied in health and disease by Christie and McIntosh (1934) and Christie and Meakins (1934). Various methods have been devised for registering intra-oesophageal pressure and the simplest one is by using a toy-balloon tied to a conveniently long rubber tubing (Payne and Poulton, 1927). Because of small diameter and plasticity, the use of polyethylene tubes has made much progress in recording intra-oesophageal pressure. The various frictionless devices that have been introduced include cathode-ray oscilloscope (Stead *et al*, 1952), strain gauge (Fry *et al*, 1952 ; Wiggers, 1952) and electromagnetic pressure transducers (Otis and Proctor, 1938). In the present study, intranasal pressure changes occurring during respiratory phases were recorded and were taken as corresponding to intrapulmonary pressure changes, their relations being studied with intrathoracic pressures.

Materials and Methods

The study was made with thirty male healthy adults whose ages varied from 18 to 36 years, and included medical students, laboratory employees and other members of the population. Every subject was given a special training of swallowing the tube for a day or two before the actual test. He was called early in the morning, before breakfast, for the test.

Intrapulmonary pressure was determined by putting a glass tube (one end of which was guarded by a sponge rubber) into one nostril, and the subject was allowed to breathe through the other nostril. The glass tube was connected to the tambour for recording the pressure changes. A permanent calibration for pressure was made for the records, as all the readings were taken with the same tambour and pointer.

For recording intrathoracic pressures a thin elastic toy balloon 5 cm. in length was tied to a stomach tube so as to include all the side holes of the tube into the balloon. The capacity of the balloon was roughly 6 ml. The tube with the balloon was sterilised by boiling in water. The subjects were asked to swallow the tube with the balloon up to a distance of 27 cm. as indicated on the stomach tube. About 6 ml. of water were then pushed into the tube from a height by means of a 10 ml. syringe and an attempt was made in every case to remove the air that was trapped inside the balloon and the rubber tube by sucking in and pushing in the water. After sometime the tube was connected to the tambour and stethographic record was obtained in the usual manner.

The present method of estimation of intrathoracic pressure was similar to that used by Payne and Poulton (1927) who used air instead of water in the rubber balloon. Christie and McIntosh (1934) directly determined intrapleural pressures in human subjects. Intrathoracic pressures were later studied by other workers by recording intra-oesophageal pressures either using a balloon tied to a thin polythene tube or simply a polythene tube (Dayman, 1951 ; Dornhorst and Leathart, 1952 ; Fry *et al*, 1952 ; Livingstone, 1928 ; Mead *et al*, 1954 ; Olsen and Creamer, 1957 ; Otis and Proctor, 1938 ; Bahn *et al*, 1946 ; Stead *et al*, 1952 ; Wiggers, 1952). In every case the intra-oesophageal pressures were noted by means of a water manometer connected to a tambour and the balloon through a T-tube.

Every subject was made to rest for 15 minutes in chair. Then he was asked to swallow the tube with the balloon ; and simultaneously three records were taken. The changes occurring due to voluntary hyperpnoea and those after mild exercise were recorded in the sitting position.

Every record contained a time-tracing below the lowest record of the intrathoracic pressure. This was done with the half of a special time tracer in which each division represented one second.

Results

The results obtained can be studied under the following headings :

1. Measurements of changes in intrapulmonary pressure during inspiration and expiration in intrathoracic pressure during inspiration, with quiet breathing in sitting, recumbent and standing positions :

The quantity of air breathed in was determined in every case by calibrating a stethographic record with the help of a spirometer. During quiet breathing this showed wide variations ranging from 420 to 1120 ml. The readings of intrapulmonary and intrathoracic pressures showed a comparatively smaller change (Table 1). For the sake of uniformity of results the pressures were calculated as those occurring in 100 ml. of air breathed in (as during quite inspiration—intrapulmonary and intrathoracic pressures) and out (as during quiet expiration—intrapulmonary pressure). The results with mean values and standard deviations are given in Table 1.

The intrathoracic and intrapulmonary pressure changes resulting from hyperpnoea of varying degree in all subjects were recorded and tabulated (Table 1). Further, the surface area of each subject was calculated in square metres from their respective body weights and heights, using the DuBois formula. The results of the pressures calculated in terms of surface area with the mean values and standard deviations are given in Table 2.

Table 1—Showing Mean Values and Standard Deviations of Changes in Intrapulmonary and Intrathoracic Pressures Calculated per 100 ml. of Air Breathed (in and out) during Quiet Respiration in Sitting, Recumbent and Standing Positions (No. of Observations 30)

	Pressure (cm. H_2O) in different positions								
	Sitting			Recumbent			Standing		
	Intrapulmonary		Intra-thoracic negative	Intrapulmonary		Intra-thoracic negative	Intrapulmonary		Intra-thoracic negative
	Inspiration negative	Expiration negative		Inspiration negative	Expiration negative		Inspiration negative	Expiration negative	
Mean ...	−0·4327	+0·2926	−0·1569	−0·4109	+0·2780	−0·1710	−0·3460	+0·2190	−0·1511
S.D. ...	±0·1950	±0·1780	±0·3732	±0·4218	±0·3620	±0·2940	±0·1840	±0·1980	±0·1780

TABLE 2—SHOWING SURFACE AREA (DUBOIS) AND PRESSURES PER SQ. METRE BODY SURFACE

Sl. No.	Body surface area in sq. metres	Pressure (cm. H_2O) per sq. meter		
		Intrapulmonary		Intra-thoracic negative
		Negative	Positive	
1	1·429	2·799	2·799	1·014
2	1·63	3·067	3·067	1·226
3	1·64	4·267	3·651	1·830
	Mean	−3·217	−2·646	−1·412
	S.D.	±1·061	±0·9877	±0·4883

DISCUSSION

The significance of simultaneous quantitative tracings of tidal volume and intra-oesophageal pressure is that they form a record of respiratory mechanism—the change in intra-oesophageal pressure during inspiration representing the force exerted and tidal air the actual work done (Christie and McIntosh, 1934). It is a complete record of distensibility of the lung *in vivo*. Since the time intra-oesophageal pressures were taken for determination of intrathoracic pressures the work on lung compliance became much easier and the least troublesome to the subjects or patients in whom such tests were performed. The local contractions of the plain muscles of the oesophagus occurring as a result of the presence of a foreign body such as the balloon is perhaps the only disadvantage of the procedure. However, the local contractions and the frank peristalsis which may begin in the oesophagus usually last only for sometime. In fact, in the above study, in no case did the procedure of obtaining intra-oesophageal record become impossible. Wherever possible such pressure changes should be recorded with modern sensitive instruments having much less inertia, such as the cathode-ray oscilloscope (Saxton *et al*, 1956). Such delicate instruments were, however, not available to us.

The intrapulmonary and intrathoracic pressures have been found to vary directly with the amount of air breathed. While studying the relationship between the volume of the normal lung and the elastic force, Stead *et al* (1952) found that it is curvilinear in form. Actual calculation of the intrathoracic pressure changes to produce a change of 100 ml. in the volume of the lung gave results which are shown in Table 3.

The results obtained in the present series are low and show wide variations as compared to those of Stead *et al* (1952) which were obtained with more sensitive apparatus.

TABLE 3—SHOWING CHANGES IN INTRATHORACIC PRESSURE (IN CM. H_2O) PER 100 ML. CHANGE IN LUNG VOLUME

Investigator	No. of cases	Intrathoracic pressure	
		Mean	S.D.
Stead *et al* ...	10	−0·43	±0·096
Present author (sitting position) ...	30	−0·1569	±0·3732

The results obtained indicate the intrapulmonary pressure which actually means the pressure in the terminal air spaces. Under static conditions, when there is no movement of the lung at the end of the expiratory level and no obstruction in the airway, the intrapulmonary pressure is normal atmospheric. This is equal to the sum of the intrathoracic pressure and the elastic forces of the lung. With the air moving in and out the pressure changes represent the pressures necessary to produce a gas-flow into and out of the bronchopulmonary tree.

By changing the posture of the subjects, important results have been obtained from the present data. Thus intrapulmonary and intrathoracic pressures have attained the highest value in the sitting position and lowest in the standing position. It is well known that the value of vital capacity is higher in the standing than in the recumbent position. This means that there occurs a change in the distension of the lungs with postural changes. It is also known that changes in the posture are accompanied by changes in the functional residual air (Christie and McIntosh, 1934 ; Livingstone, 1928) and such changes reflect upon those in the intrathoracic pressure. Thus when the position of the subject is changed from the recumbent to the sitting there is a marked fall of intrathoracic pressure at the end of both inspiration and expiration (Christie and McIntosh, 1934). Unfortunately in the records obtained in the present series it was not possible to obtain a negative intra-oesophageal pressure at the resting expiratory level.

The last record was that of hyperpnoea following exercise. The same type of exercise was given to all the subjects. This was done in order to have more pressure changes occurring as a result of increased amount of air movement with a rapid rate. As it was not possible to measure the rate of movement of air these records could not be compared with those obtained by asking the subject to perform deep inspiration voluntarily, as was done in the sitting position. Further it is very striking that many of the readings showed much better deflections in the intra-

pulmonary and the intra-oesophageal pressures. This was probably due to much greater stretching on the balloon in the oesophagus and increased quantity of air being moved in and out of the lungs. This gives support to the fact that the registering system had a good amount of inertia. Correspondingly the mean and standard deviations gave fairly comparable figures. The hyperpnoea, being the result of a standard exercise given to the subjects, produced more comparable changes in intrathoracic and intrapulmonary pressures than those which could have resulted from continuous voluntary hyperpnoea involving the body build and power of inspiratory muscles of the subjects.

Summary and Conclusions

With the apparatus available in the laboratory the relationships between the phases of respiration and changes in the intrathoracic and intrapulmonary pressures were studied. Quantitative values for these pressures have been determined with the help of water manometer in three postures, e.g., sitting, recumbent and standing. Negative intrathoracic and intrapulmonary pressures were recorded during the inspiratory phase of respiration, with respect to the atmospheric pressure. During the expiratory phase, the intrathoracic pressure used to come to a resting level but the intrapulmonary pressure was recorded as positive, coming to a resting level at the end of expiration.

It was also observed that increase in the lung volume, as took place in voluntary deep inspirations (in sitting position) and in hyperpnoea resulting from a standard exercise (under 'moderate exercise'), increased the intra-oesophageal and intrapulmonary pressures proportionately.

Attempts to register the negative intra-oesophageal pressure at the end of expiratory level of respiration were not successful. Accordingly changes in the above pressure, resulting from changes in posture, were not obtained.

On the whole the results obtained in the present series do not stand comparison with those obtained by other workers. In all probability this is due to lack of availability of sensitive instruments which were used by other workers for registering the pressures. With the advent of modern physiological researches a large number of pulmonary function tests have proved to be of definite use, and the determination of lung elasticity forms a very important part of such test. Simpler tests like determination of maximum breathing capacity, vital capacity, inspiratory and expiratory force tests, do not require special and complicated apparatus. Determination of intrathoracic pressures and intrapulmonary pressures although requiring a little complicated apparatus, should be included in the above routine tests.

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PRACTITIONERS' SERIES

RECENT TRENDS IN THE MANAGEMENT OF PRE-ECLAMPTIC TOXAEMIA

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It is unfortunately to be accepted that the pre-eclamptic toxaemia is a disease characterised by signs rather than symptoms. When symptoms appear, the disease is already in a pretty advanced state. So the treatment should be directed towards the prophylaxis and to the earliest manifestation of pre-eclamptic toxaemia. With adequate antenatal care it is possible to detect the condition in its earliest stage but it is not yet possible to prevent its onset. The introduction of non-mercurial

diuretics, effective hypotensive drugs, ion-exchange resins and timely interference with frequent use of caesarean section have considerably improved the maternal as well as foetal salvage within recent years.

From treatment point of view pre-eclamptic toxaemia can be arbitrarily divided into mild and severe groups, the former showing the blood-pressure ranging between 140/90 and 160/100 mm. Hg, and the latter having blood pressure above 160/100 mm. Hg. In the mild group oedema and/or albuminuria is usually absent or minimum. In the severe group, the latter may be present in variable degrees. Apart from this there is another grade which is known as pre-eclampsia or pre-eclamptic state, or imminent eclampsia or fulminating toxaemia which is characterised by blood pressure above 160/100 mm. Hg, urine loaded with albumin, widespread oedema, drowsiness, headache, dimness of vision, vomiting, epigastric pain, diminished urinary output (less than 10 oz. in 24 hours).

Prophylaxis—Rigid antenatal care all through pregnancy is essential. It is directed towards (i) checking of blood pressure, (ii) checking of weight (iii) examination of urine, (iv) restriction of salt in the third trimester, (v) limiting of weight gain to 15 to 20 lb. throughout the pregnancy, and (vi) use of well-balanced diet with supplement of iron.

Curative treatment—The objectives are (i) to avoid immediate and remote maternal complications, e.g., eclampsia, accidental haemorrhage, hypertensive encephalopathy, renal complications, residual hypertension, recurrent toxaemia, etc.; (ii) to have a living baby and to avoid prematurity.

I. Treatment of the Mild Group

Although an ideal procedure, in the present set-up it is very difficult to hospitalise all pre-eclamptic toxaemia cases with blood pressure raised up to 140/90 mm. Hg. In spite of the fact that domiciliary treatment of mild pre-eclampsia is doomed to failure in some cases, e.g., in primigravidae in whom weight and diet control and adequate rest cannot be enforced, our practice is to treat mild cases at home.

The measures taken in such cases are directed towards (i) control of incipient oedema, and (ii) control of the early and as yet rather labile blood pressure. The steps taken are:

1. Additional *bed rest*—2 hours' rest after mid-day meal and 8 hours' sleep at night.
2. *Diet*—High protein, adequate carbohydrate and restricted fat, adequate vitamins and minerals.
3. Restricted *intake of Na-salt*—Table salt is avoided and extremely sparing amount of salt added for cooking.
4. *Sedative*—Usually no sedative is necessary unless the patient suffers from disturbed sleep. Sound sleep and emotional tranquillity help in preventing sudden rise of systolic pressure.
5. *Purgative*—Bowels should be kept open, if necessary by taking some mild laxative.
6. *Urine*—Plenty of fluid may be taken to ensure proper flushing of kidney.
7. Checking of blood pressure daily, examination of urine for albumin are recommended.

In the majority of cases pre-eclamptic toxaemia can be checked at this stage, and pregnancy may end in delivery of a healthy child without any untoward effect on the maternal health. But if after a week or two of home treatment there is no marked improvement the patient must be hospitalised for complete rest and observation. The indications for hospitalisation are:

(i) Blood pressure—remaining persistently at a level higher than 140/90 mm. Hg.
(ii) Proteinuria + + or more.
(iii) Oedema, appearing or persisting in spite of adequate rest.
(iv) Weight gain, more than 3 lb. a week.

II. Management of the Severe Group

As the exact cause of pre-eclamptic toxaemia is as yet unknown, the treatment is essentially symptomatic. The most important in the management of this group are:

1. *Bed rest*—The patient is kept in absolute bed rest. Necessary measures taken include: (a) Blood pressure, recorded 4-hourly, (b) fluid intake and output charted, (c) quantitative estimation of albumin in urine done daily, (d) ophthalmoscopic examination every 2 to 3 days, (e) blood biochemistry (urea, N.P.N. etc.) is not so essential and helpful for management.

2. *Diet*—High protein, low-sodium, low caloric diet. Even in salt free diet 3 g. of Na is taken daily. To make it further Na-free various other measures may be taken, e.g., Kempner's diet, administration of diuretics e.g. chlorothiazide or ion-exchange resins. Kempner's diet consists of rice cooked in distilled water, sugar, fruit juice, vitamins, iron etc. may also be supplemented. This diet supplies 20 g. of protein and 0·2 g. of Na. The difficulties are (i) non-palatable, (ii) low salt syndrome may develop if complete salt restriction is continued for some time.

3. *Fluid intake*—Should be restricted up to 3,000 ml. in 24 hours. According to others, plenty

of fluid should be given to flush out kidney, provided there is no decompensated heart diseases or renal diseases.

4. *Sedation*—On admission some sedative should be administered to allay apprehension of hospitalisation. This may be done with one initial dose of injection of morphine, ¼ grain subcutaneously or injection of luminal, 3 grains intramuscularly, followed by 6-hourly administration of injection of paraldehyde—6 ml. intramuscularly or injection of magnesium sulphate, 20 per cent 10 ml. intramuscularly or injection of largactil 25 mg. intramuscularly. They not only ensure sleep but also act as hypotensive agents. As soon as blood pressure reaches a safe level (this may require 48 hours) the sedatives should be gradually withdrawn, otherwise the patient may become a drug addict.

5. *Hypotensive drugs*—Although various new vaso-depressor drugs are on trial at present the result is not uniformly good and persistent. These drugs are not free from dangers, and both the mother and the baby may be involved. The practical problems regarding hypotensive agents are: (i) At what level of blood pressure should these drugs be used, and how long should they be continued? Usually, if the blood pressure is persistently above 160/100 mm. Hg for more than 48 hours in spite of hospitalisation, absolute bed rest, and sedatives, then the question of the use of hypotensive drugs should be considered. A suitable agent should be continued till the blood pressure persistently remains at a saft level—usually below 160/90 mm. Hg, (ii) Various hypotensive agents—their mode of action, dose and method of administration, toxicity and relative values need consideration.

1. Ganglion-blocking agents:
   (a) Tetraethyline ammonium (T.E.A.),
   (b) Pentamethonium (C_5),
   (c) Hexamethonium (C_6) bromide, chloride and tartrate, e.g., vagolysin, mecamylamine, pempidin, inversin, ismylin.
   (d) Pentonium—ansolysin,
   (e) Azamethonium,
   (f) Ecolid,
   (g) Arfonad.
2. Rauwolfia alkaloids: Hypothalamus depresant.
3. Veratrone alkaloids, acting on cerebral centres.
4. Hydrazinophthalazine: apresolin, acting on central nervous system.
5. Adrenergic blocking agents: dibenamine, dibenziline, hydrogenated ergot alkaloid—not tolerated in hypotensive doses.

The commonly used hypotensive agents are:

(A) Hexamethonium (vagolysin):

Oral—250 mg., 4 times daily initially. This is increased as tolerance develops until the total dose is 2, 3 or 4 g. daily.

Injection—Initial dose, 5 mg. intramuscularly. Then depending on the reaction, 50-250 mg. for a single dose.

Complications—(i) Tolerance, (ii) bromism, (iii) renal failure, (iv) postural hypotension, (v) parasympathetic ganglion blockade—(a) delay in gastric emptying, (b) constipation due to intestinal relaxation, (c) dryness of mouth, tongue and skin, (d) paralytic ileus of the baby.

(B) Ansolysin: Difference from vagolysin:

(i) 5 times as potent as hexamethonium.
(ii) Duration of action—40 per cent greater.
(iii) Better absorbed from the alimentary tract.
(iv) Less parasympathetic ganglion blockade.

(C) Rauwolfia (Serpasil):

Action—(i) Fall in blood pressure, (ii) sedative effect on central nervous system. Effect comes on after an interval of 1 hour and lasts for about 6 hours. Dose—0·75 to 1·5 mg. daily.

Toxicity—(i) Loose stool due to increased intestinal peristalsis, (ii) dyspnoea at rest, (iii) lethargy, depression, (iv) nasal congestion, (v) impotency.

(D) Veratron, veriloid:

Dose—By injection, 10 minims I.M. at 15 minutes interval until pulse rate is lowered to 60 per minute or the systolic pressure is lowered to 120 mm. Hg.

Toxicity—(i) Salivation, (ii) nausea, (iii) vomiting.

(E) Apresolin:

Action—(i) Lowering of both systolic and diastolic pressure, (ii) circulation of brain and kidney is not reduced

Dose—Orally, intramuscularly or intravenously—10 mg. 4 times daily and gradually increased to 100-400 mg. daily depending on tolerance of the individual. It is usually combined with serpasil and adelphane containing apresolin 100 mg. plus serpasil 0·5 mg.

(F) Largactil :

Action—(i) Hypnotic, (ii) hypotensive by peripheral vasodilation, (iii) hypothermic and (iv) antiemetic.

Toxicity—(i) Nausea, anorexia, epigastric pain. (ii) Liver damage—jaundice. (iii) Drug fever. (iv) Agranulocytosis.

Dose—25 mg. intramuscularly, intravenously or orally.

6. Diuretics :

(i) Ammonium chloride in cachets—15 grains thrice daily for 3 days. It is absorbed from the gastro-intestinal tract and goes to the liver where it is converted into urea. Chloride displaces bicarbonate and is excreted with sodium. It should not be used in renal insufficiency. (Urine is previously acidified by giving HCl). It is given for 3 days and is followed by 3 days' rest.

(ii) Carbonic anhydrase inhibitor—500 mg. twice daily for 5 days. Danger : electrolyte disturbance.

(iii) Chlorothiazide and hydrochlorothiazide :

Action—Both diuretic and hypotensive, without any alteration in the electrolyte balance.

Dose—500 mg. twice daily. Equimolar excretion of sodium and chloride.

Toxicity—(i) Tingling and numbness, (ii) nausea and vomiting, (iii) maculopapular rash, (iv) hyperuricaemia due to altered renal excretion.

7. Purgative—S.S. magnesium sulphate one ounce may be given from time to time to open the bowels.

8. Ion-exchange resins :

Action—Ammonium or potassium resins are used. These are exchanged for sodium in the alimentary tract. Thus some of the sodium is rendered insoluble and so absorption is prevented. Liberated ammonia or potassium is absorbed as NH_4Cl or KCl. It is effective only for 2-3 days. It produces a compensatory acidosis.

Dose—75 g. of ammonium resin daily for 2 days, followed by 50 g. of potassium resin daily for 3 days. Then there should be 2 days' rest.

Effect—(i) Reduction of severe pre-eclamptic toxaemia, (ii) reduction of prematurity and neonatal mortality, (iii) increase in the patient's resistance to any operative interference, if necessary.

Danger—Electrolyte imbalance, hypokalaemia and acidosis. It is not much used now-a-days.

III. Management of the Fulminating Type

All measures to be taken just in the same way as in an eclamptic patient. Intensive sedative measure is carried out for 24 hours. Usually magnesium sulphate 20 per cent 10 ml. is given intramuscularly or intravenously 6-hourly. Hypotensive drugs may also be tried. 20 per cent glucose is given in rapid I.V. drip, about 500 ml. This produces sudden hyperglycaemia and helps in diuresis and lowering of blood pressure. If the pressure cannot be effectively reduced or renal function cannot be improved within 48 hours by the conservative measures, termination of pregnancy should be considered.

Termination of pregnancy—The purpose of termination of pregnancy is prevention of (i) convulsions, (ii) remote complications, e.g., residual hypertension, recurrent toxaemia and (iii) intrauterine death of the foetus.

INDICATIONS FOR INDUCTION OF LABOUR :

(i) Severe group of pre-eclamptic state not responding to conservative treatment. Duration of pregnancy—35-36 weeks.

(ii) Maintenance of blood pressure at 140/90 mm. Hg or above, in spite of treatment for more than 14 days. Duration of pregnancy—more than 37 weeks.

(iii) At term even in mild cases of pre-eclamptic toxaemia;

(iv) Continuing slight or recurring albuminuria—Duration—14 days;

(v) To avoid placental insufficiency—gestation at least of 36 weeks.

METHODS OF INDUCTION :

1. Medical induction—Castor oil, enema followed by syntocinon drip.
2. Surgical induction—Artificial rupture of membranes, with or without syntocinon drip (1 in 5,000 or 2,500). 1 unit of syntocinon dissolved in 540 ml. of 5 per cent glucose solution—at the rate of 12 drops per minute given initially rising up to 60 drops per minute after ½ hour.
   (a) Near term, if the cervix is ripe and even in mild pre-eclamptic toxaemia—artificial rupture of the membrane.
   (b) Mild pre-eclamptic toxaemia with os closed—Wait up to term—then artificial rupture of the membrane.
   (c) If after 48 hours os remains closed in spite of syntocinon drip, specially in primipara with severe toxaemia, caesarean section should be advised.

PLACE OF CAESAREAN SECTION IN PRE-ECLAMPTIC TOXAEMIA

Incidence of caesarean section in pre-eclamptic toxaemia is about 3 per cent.

Indications—The indications for caesarean section in pre-eclamptic toxaemia are :

(i) Imminent eclampsia ;

(ii) Severe pre-eclampsia continuing for some time in spite of energetic medical treatment, specially in the primigravida with closed servix at 37 weeks of pregnancy ;

(iii) Other associated obstetrical complications, e.g., cephalopelvic disproportion, malpresentations, accidental haemorrhage, etc.

SUMMARY

In mild pre-eclamptic toxaemia, rest and salt restriction with occasional sedation are good enough for continuation of pregnancy. Prognosis for both mother and baby does not differ much from that in normal pregnancy. But in severe group or in imminent eclampsia, incidence of maternal and foetal complications is very high if immediate and adequate measures are not adopted. The most important measure is, of course, rigid antenatal care which alone can prevent occurrence of the severe grade of pre-eclamptic toxaemia.

SPECIAL ARTICLE

GRANULOMA VENEREUM
A Statistical Study of 50 Cases

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Though granuloma venereum is not a rare clinical entity in the Madras and Andhra States, the degree of suspicion for this venereal disease is lamentably low among the practitioners. A decade or so ago, cases of granuloma venereum of the penis were mistaken for carcinoma, and amputations of the penis done by unwary surgeons. Recent knowledge about this venereal disease, which clinically simulates the early stages of cancer penis, has prevented such grave errors of diagnosis. This venereal disease can also affect the mouth (Fig. 1, *vide* Plate) and can be wrongly diagnosed as cancer cheek. Practitioners often mistake the anogenital lesions of this disease for syphilitic or chancroidal ulcers or warts and treat them with penicillin or sulphonamides without any improvement. A greater awareness of the disease is considered essential for a correct diagnosis and treatment of anogenital and oral ulceration. Moreover, many confuse the disease with another venereal disease named lymphogranuloma venereum. It must be remembered that the latter is a viral disease of the genitalia and anorectum, affecting the lymphoid tissue and is characterised by an insignificant primary genital sore, a subacute inguinal bubo, a chronic elephantoid condition of the genitalia, and anoproctitis with or without stricture.

Granuloma venereum is a chronic, slowly progressive disease. It is characterised by a granulomatous ulceration, primarily genital in location but subsequently extending to the neighbouring regions (Figs. 2 and 3, *vide* Plate) and rarely even to the buccal mucosa and other tissues of the body.

METHOD AND MATERIAL

A statistical study of the case records of all the 50 male patients with granuloma venereum who attended the Erskine Hospital, Madurai, during the period September 1957 to August 1959, has been attempted with reference to age, occupation, marital status, residence, clinical types, location of the lesions, type of the causative organism, dosage and effect of treatment, with a view to ascertaining the nature and extent of the problems connected with incidence, pattern, diagnosis and treatment of the disease.

Results and Comments

Incidence—Granuloma venereum forms 1·5 per cent of the total number of cases of venereal diseases. Its incidence in Madurai is low when compared to that of syphilis and gonorrhoea, the corresponding figures of the latter diseases are 27·3 and 14·4 per cent respectively (Rama Ayyangar, 1959). Thus it is not a major V. D. problem. The incidence of this disease in other hospitals is given in Table 1.

Table 1—Showing Incidence of Granuloma Venereum

Hospital	Year	No. of cases	% of total V.D. cases
Government Hospital, Madras	1953	136	1
Government Hospital, Guntur (Serma, 1957)	1955	157	2·58
Government Headquarters Hospital, Visakhapatnam	1953	47	
Mission Hospital, Vellore ...	1950-54	32	

The incidence at Madurai is much less than that at Guntur or Madras.

Sex distribution—During the 2-year period under review 50 men and 22 women were treated in this hospital for the disease, so that the sex ratio works out to be 2·3 (M) : 1 (F). No attempt was made to investigate the sexual partners by epidemiological methods, so that no inference could be drawn from this series with regard to infections in the partner.

Marital status—The distribution was as follows: 18 married, 7 widowers and 25 unmarried. The incidence is as great among the single as in the married, in contrast to the reported figures of the General Hospital, Madras, which are 20 per cent for married and 80 per cent for single subjects.

Age distribution—This is shown in Table 2.

Table 2—Showing Distribution of Cases by Age

Age group (years)	No of cases	Age group (years)	No of cases
17—23 ...	15	36—41 ...	6
24—29 ...	13	42—47 ...	3
30—35 ...	8	Above 48 ...	3

Minimum age 17. Maximum age 55. Mean age 27.

The most vulnerable age periods are 17-23 and 24-29.

Distribution with regard to residence—The number of patients coming from urban area was 7, while that from rural area was 43. Of the latter, 22 came from different taluks of Madurai district and the rest from other districts. These figures suggest that the incidence of granuloma venereum in the town is low as compared to that in the mofussil.

Occupation—The following is the breakdown of figures with regard to the occupational status of the patients. Unskilled workers 15 ; *ryots* 11 ; petty vendors 6 ; skilled workers, hotel servants, cart drivers, clerks, weavers, 2 each ; student 1 ; others 7. These figures prove that this venereal disease affects mostly the people of low socio-economic status.

Incubation period — Interrogations of the patients showed that the incubation period was indefinite in many cases, while it varied from 1 week to 4 months in others. Thus it has not been possible to get at a correct figure about the length of the incubation period of the disease.

Duration of the disease—This varied from 15 days to 2 years: 15 days in 3, 1 month in 6, 2 months in 13, 3 months in 9, 6 months in 6, 1 year in 6, 1½ years in 2 and 2 years in 5 cases (2 cases in the groin and 3 cases with anal lesions). Thus it is seen that the disease is essentially chronic and slowly progressive, that it may not be severe enough to drive the patients to seek medical relief, and that even the medical aid sought for had not been very helpful.

Number of lesions and types of lesion—Patients with single lesions numbered 19, those with multiple lesions 18 and those with extensive lesions 13. Table 3 shows the number of cases according to the type of lesion.

Table 3—Showing Incidence of Different Types of Lesion

Type of lesion	No. of cases
Fleshy and exuberant	31
Hypertrophic verrucose	7
Destructive, necrotic	10
Cicatricial or sclerotic	2

There were 4 cases of unruptured pseudobubo (3 in the groin and 1 in the penile shaft) in this series.

Site of the lesions—This is shown in Table 4.

The primary lesion occurred in the genital zone in 38 cases and in anal region in 9 cases due to pederasty. Seven cases showed lesions in genito-inguinal region (typified in Fig. 4, *vide* Plate). In the 3 cases with only inguinal lesions (typified in Fig. 5, *vide* Plate) there was history of primary penile sore and there were, in 2 of them,

TABLE 4—SHOWING SITES AFFECTED BY THE LESIONS

Site affected	No. of cases	Site affected	No. of cases
Genital ...	25	Anogenital ...	1
Genito-inguinal ...	7	Fraenal ...	7
Genitoscrotoperineal	1	Coronary sulcus ...	14
Genito-inguinoperi-neo-anal ...	1	Glans ...	9
		Prepuce ...	14
Genito-inguino-peri-neo-oral ...	1	Penile shaft ...	14
		Groin ...	13
Genito-inguino-oral and cervical ...	1	Scrotum ...	3
		Scrotocrural junction	5
Genito-oral ...	2	Perineum ...	6
Inguinal alone ...	3	Primary ...	9
Anal ...	5	Oral ...	4
Anoperineal ...	3	Neck ...	1

penile scars. Thus it is seen that the extragenital lesions are secondary to the genital or anal lesions. In this series there were 4 cases with oral lesions (an incidence rate of 8 per cent). There were 9 cases of primary anal lesions typified in Fig 7, *vide* Plate) revealing the part played by the anal canal in perverted sex gratification. The anal mucosa is however not affected in this disease. Also in women, the lesions may occur in the cervix uteri and may be mistaken for cancer cervix unless a biopsy or tissue-spread examination is done.

The characteristic wavy border of the ulcers was present in 14 cases (oral 1). All the 31 cases of fleshy exuberant type were characterised by soft, velvety, bright pink, granulomatous ulcerations which bled easily on handling. The hypertrophic type of cases looked like papillomatous warts and had to be differentiated from the latter. The glands in the groin were not involved in 45 cases while they were enlarged in 2 and buboes occurred in 3. The regional glands were not usually involved unless there was a superimposed infection or associated disease. There was no case of systemic dissemination which may however rarely occur in the liver or the bone. In one patient with extensive lesions, the liver was enlarged but liver biopsy showed only fatty degeneration but no Donovan's organisms.

Concomitant diseases found were Hansen's disease (2 cases), tuberculosis pulmonis (2 cases), psoas abscess (1 case), venereal diseases, e.g., (a) syphilis (9 cases: infectious 3, latent 5, vascular neurosyphilis 1). (Blood Kahn test was negative in 41 cases). (b) Lymphogranuloma venereum (4 cases: bubo 1, anorectal syndrome 3). (All cases were affected with primary anal granuloma venereum).

Complications and sequelae—These included:

1. Superimposed fusospirochaetosis—10
2. Secondary anaemia—2 (in extensive granuloma cases)
3. (a) Stenosis of urethral orifice—nil
   (b) Stenosis of anal orifice—nil; but 3 patients who had difficulty in defecation had also lymphogranuloma venereum anorectal syndrome in addition to anal ulcers.
4. Deformities of the genitalia:
   (a) Adhesions to scrotum or pubis—1
   (b) Destruction of penile shaft:
      (i) Partial—7
      (ii) Total—2 (typified in Fig. 6, *vide* Plate)
5. Pseudo-elephantiasis of penis and scrotum —5
6. Difficulty in opening the mouth—2.

EPIDERMOID CARCINOMA AND GRANULOMA VENEREUM

These two conditions may resemble each other clinically in the early stages and even histopathologically to a certain extent. Rarely cancer may supervene on a pre-existing granuloma ulcer, or granuloma venereum may be contracted by a person with penile epithelioma. But a true carcinomatous change occurring as a sequela of granuloma venereum is a rarity. In the present series there were 2 cases in which there was, in addition, the histological picture of epithelioma (i.e., in 4 per cent of the cases)—the corresponding figures reported by Greenblatt *et al* (1948) being 6·3 per cent and by Rajam and Rangiah (1954) 0·25 per cent.

CASE REPORTS

Case 1—Patient was aged 40, and the duration of disease was 2 months. There was a characteristic granulomatous ulceration with wavy border all round the coronal sulcus. Mature forms of Donovan bodies were seen. Biopsy showed epidermoid carcinoma. The patient absconded before treatment could be started.

Case 2—Patient was aged 30, and the duration of disease was 2 months. Patient had a cauliflower like growth on the glans penis, and coronal sulcus. Mature forms of the organisms were seen. Streptomycin therapy caused only a slight regression of the ulceration. This was probably a case of granuloma venereum being superimposed on a pre-existing cancerous lesion of the penis.

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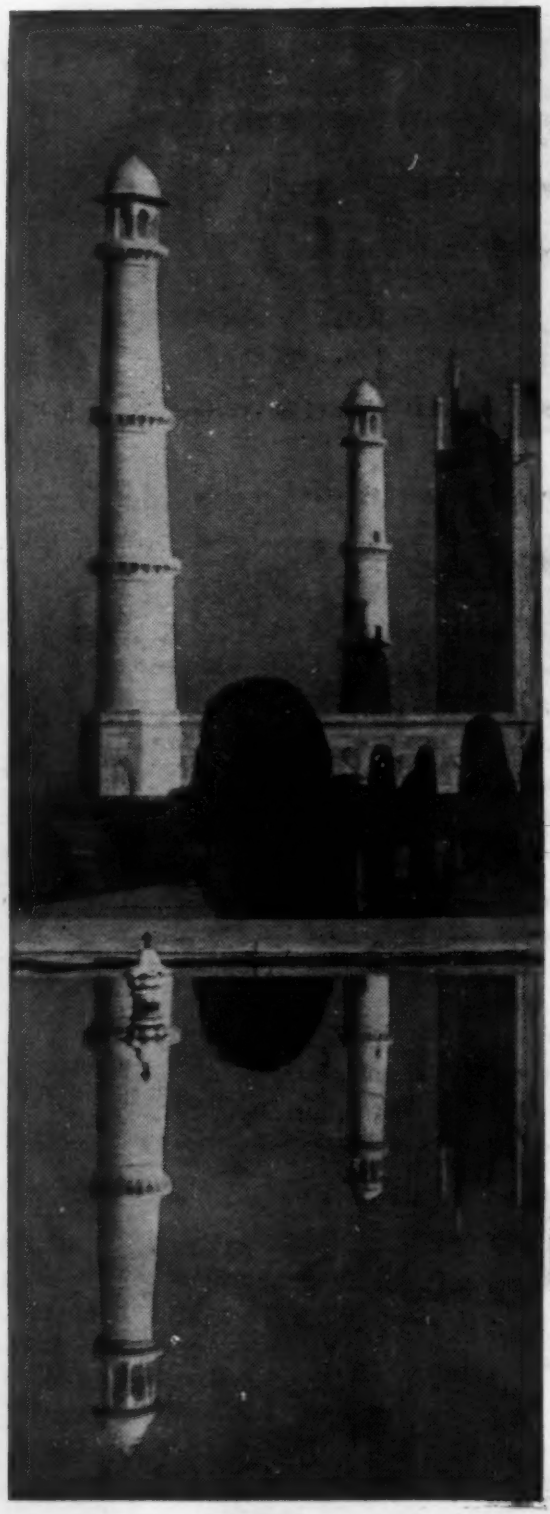

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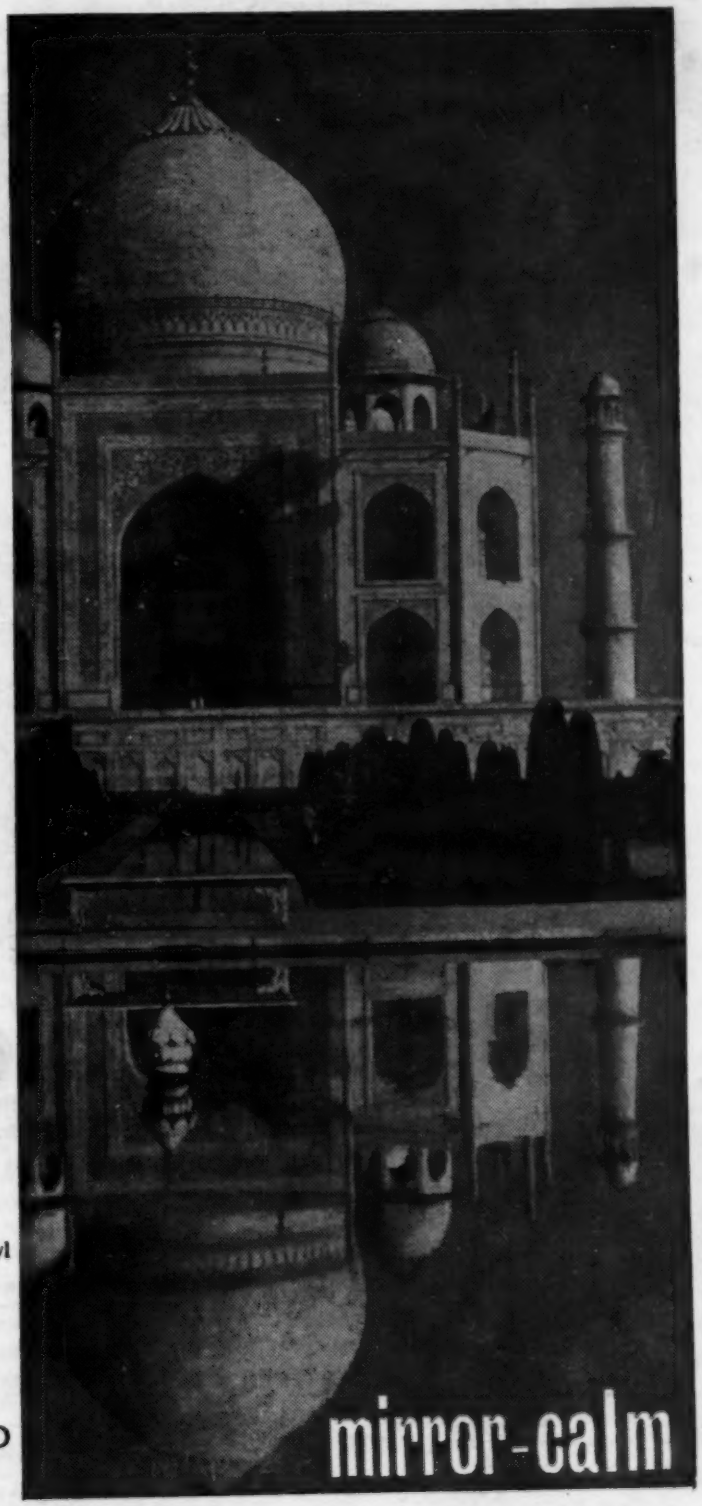

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organisms in all except 2 cases (Table 5). Careful and thorough examination was considered essential, especially in (a) early cases, (b) cases with sclerotic type of ulcers, and (c) cases with superimposed banal infection. In the last group it was also necessary to get the secondary infection controlled first before the organisms became demonstrable. Of the 48 smears, 2 were negative for the *Donovania granulomatis* (D.G.). These two cases were clinically typical.

TABLE 5—SHOWING RESULT OF LABORATORY INVESTIGATION

Location of lesion	Negative	Immature only	Mature only	Both types
Penis	1*	23	6	5
Groin	—	6	—	2
Perineum	1**	—	—	1
Anal region ...	—	6	1	2
Oral region ...	—	2	—	1
Neck	—	1	—	—

* Early case of 15 days. ** Cicatricial type.

The mature or capsulated forms, though said to be degenerating, were seen even in early lesions of 1 to 2 months' duration, while the immature or young forms (non-capsulated) were seen even in chronic cases of 1 to 2 years. Immature forms were seen in the aspirated material in 2 cases of unruptured pseudobubo (one of groin and one of shaft of the penis).

Biopsy was done in 5 doubtful cases. Two showed epidermoid carcinoma ; in two there was no evidence of malignancy, and one showed warty hyperplasia.

TREATMENT

Dosage and effect—Of 50 patients, 16 did not get any treatment as they defaulted ; 2 others had only a few injections. Of the rest, 22 had the usual course of treatment, e.g., streptomycin-dihydrostreptomycin, 1 g. twice daily for 10 days. 14 had penile lesions for ½ to 8 months, 3 had lesions in the groin for 6 to 24 months, 4 had anal lesions for 6 to 18 months, and one had oral lesion for 1 year. 17 were of fleshy type, 4 were warty and one was 'destructive' in type. The immature organisms were seen in 17, mature forms in 4 and both forms in 4 cases. The results in all the fleshy type cases were excellent. By the fifth day the ulcers became less raw and began to heal from the edges. Within a week of stopping therapy the ulcers had completely healed with scar formation. However in a few chronic cases or cases with extensive lesions, some raw areas remained unhealed and these had to be cauterised with copper sulphate. The results were not very good in some cases with phimosis or verrucose type of lesions.

The former patients had to be circumcised and the latter painted also with podophyllin or excised (anal cases). Results were not good in another 8 cases (verrucose type, 2 ; extensive lesions, 2 ; and perineal lesions, 2 ; genito-inguinal, 2). These patients had to be given another course of streptomycin before satisfactory regression of the lesions occurred. The response therefore did not depend on the size of the lesion or its location or duration, though as a rule oral lesions took a longer time to heal.

Other treatments—Poor general health (in 3 cases) required simultaneous administration of vitamins and nutritious diet. The concomitant fusospirochaetal infection and syphilis were treated first with PAM. In cases associated with lymphogranuloma venereum with anorectal syndrome the appropriate treatment was given after streptomycin therapy had been completed. One patient who had also lymphogranuloma venereum bubo in the groin was given oral sulphonamides simultaneously.

FOLLOW-UP

Bacteriological—Only in a few cases the tissue spreads were reexamined for the organisms (D.G.) during and after therapy. In most cases the organisms were not seen after administration of 10 g. of streptomycin. In one case (anal, of 2 years' duration) D.G. were seen in unhealed areas even after a total of 20 g. of streptomycin had been administered, but the organisms disappeared after the 30th g. dose of the drug had been administered.

Clinical—The patients were followed up : for 1 month in 1 case ; 2 months in 2 ; and 1 year in 1 (anal) case. There was no recurrence in the first 3 cases. In the last case there were extensive peri-anal lesions and in this case reinfection could not be ruled out. The fact that the other 26 cases did not turn up for treatment of recurrence shows that the relapse rate after streptomycin is practically insignificant.

Toxicity or intolerance to the drug—This was noted in 2 cases (6 per cent). One developed itching and urticaria after 16th g. of streptomycin and was treated with antihistaminics. The other had vertigo after 14th g. of streptomycin, which disappeared on discontinuance of the drug. He tolerated further doses later on. No case of streptomycin resistance or drug fastness was encountered and there was no necessity of treat-

ing any case with costly broad-spectrum antibiotics.

Summary

Greater awareness of this venereal disease, which does not respond to penicillin or sulpha drug, is essential when dealing with genital and anal ulceration.

This is a chronic disease of low infectivity occurring mostly in the rural population of low socio-economic status.

It is not a major V.D. problem as the incidence is quite low.

The fact that the lesions may simulate cancer and may occur in buccal mucosa or cervix uterus is emphasised.

Though the disease is not fatal the sequelae are destructive, distressing and disabling.

Its relationship to carcinoma merits detailed study.

Streptomycin is the sheet-anchor in the treatment of this disease and the response is excellent.

Acknowledgment

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CASE NOTES

PERSISTENT TRUNCUS ARTERIOSUS

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Introduction

Persistent truncus arteriosus is a rare congenital malformation. It is a single great vessel of abnormally large calibre arising from the heart and combines the feature of both the aorta and pulmonary artery. Several reports have been published under this heading. In her review of 1,000 cases of congenital heart disease Abbott (1927) classified 23 cases as examples of persistent truncus arteriosus. But according to the critical review of Humphrey (1932) and more recently that of Lev and Saphir (1942) and Manhoff and Howe (1949) all of the reported cases cannot be accepted as instances of persistent truncus arteriosus. Wood (1958) has described only one case in a series of 900 cases of congenital heart disease.

Development of the truncus arteriosus—It may be recalled that there are two primitive aortas one on each side of the midline. Each has a ventral part, a dorsal part and a connecting first aortic arch. The ventral aortas in front fuse together to form a single tube from which develop the primitive heart, truncus arteriosus, and the common ventral aorta or the aortic sac. Caudal to the first pair of aortic arch develop five other pairs corresponding to the bronchial arches. Grooves appear on the surface of the primitive heart tube. The most cranial one marks off the bulbus cordis from the ventricle.

Four endocardial cushions—ventral, dorsal, right and left lateral—form in the distal part of the bulbus cordis. The right and left fuse to form the distal bulbar septum which separates a ventral pulmonary orifice from a dorsal aortic orifice and later these cushions are modified to form the semilunar valves.

Two other ridge-like thickenings project into the interior of the truncus arteriosus. Proximally they are placed at the lateral walls of the vessel and as they are followed the right passes obliquely on the ventral and then on the left wall. The left ridge behaves just in the reverse way. Fusion of these two ridges forms the spiral aortopulmonary septum. This becomes continuous with the distal bulbar septum (Fig. A).

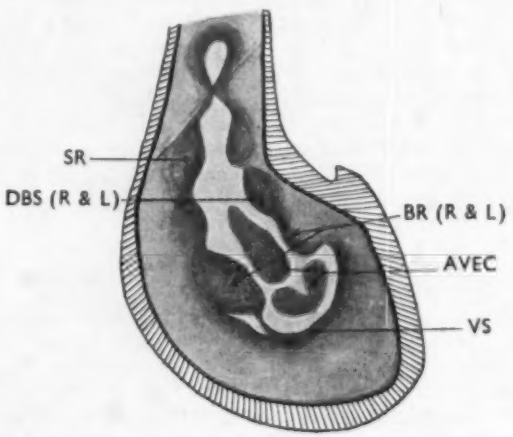


Fig. A—Showing Formation of Aortopulmonary Septum and Interventricular Septum (Diagrammatic)

SR—Spiral ridge, DBS—Distal bulbar swelling. BR—Bulbar ridge. AVEC—Atrioventricular endocardial cushion. VS—Ventricular septum. R & L—Right and left.

Persistent truncus arteriosus overrides the ventricular septal defect as an integral part of the malformation and it will be convenient to describe the development of interventricular septum here. The upper part of the

septum is formed by the fusion of (i) ventricular septum, (ii) proximal bulbar septum, and (iii) atrioventricular endocardial cushion.

The ventricular septum is formed as a sickle-shaped structure with a free upper margin. The proximal bulbar septum is formed by the right and left bulbar ridges which are continuous with the distal bulbar septum. The right one grows across on to the dorsal wall of the bulbus cordis and the right extremity of the fused A.V. endothelial cushion to reach the dorsal end of the free edge of the sickle-shaped ventricular septum and thus obliterates the ventral part of the right A.V. orifice. The left bulbar ridge grows across on to the ventral wall of the bulb to reach the ventral end of the ventricular septum and then grows along its free margin to fuse with the right bulbar ridge. The membranous part of the ventricular septum is formed by proliferation of the cushion tissue from the right extremity of the fused A.V. endocardial cushion where it is crossed by the caudal end of the right bulbar ridge (Fig. B). Failure of development of this region gives rise to patent intraventricular foramen. Due to the formation of this proximal bulbar septum, the ventral part of the bulb is

FIG. B—SHOWING THE MEMBRANOUS PART OF THE VENTRICULAR SEPTUM ARISING FROM THE PROLIFERATION OF A.V. ENDOCARDIAL CUSHION (DIAGRAMMATIC).

incorporated in the right ventricle to form the conus arteriosus. The dorsal part of the bulb is almost completely absorbed.

Originally the pulmonary plexus is formed from the ventral branch of the dorsal aorta. This plexus establishes its connection with the ventral root of the 6th arch which form the pulmonary artery. This 6th arch on the left side preserves its connection with the left dorsal aorta in the form of ductus arteriosus. Failure of development of the ventral root of the 6th arch or its early involution produces absence of pulmonary artery, in which case the lungs may be supplied either by ductus arteriosus or by bronchial arteries formed from the ventral branch of the dorsal aorta or other heterogenous arteries.

CASE REPORT

K. B., a female child, aged 7 years, was admitted in the paediatric department, Medical College, Calcutta in 1958 with complaints of progressively increasing difficulty in breathing since birth with recurrent episodes of fever and cough.

There was no relevant past and family history.

During admission her general condition was very poor and she died within a week from respiratory failure.

Physical examination revealed stunted growth with marked emaciation, and mongoloid facies. She was very dyspnoeic with intense cyanosis and gross clubbing of fingers. The neck veins were prominent. There was no oedema. The pulse rate was 120 per minute and respiration 45 per minute and the temperature was normal.

Cardiovascular system—The precordium was bulging and there was a diffuse pulsation in the epigastrium. The apical impulse was in the left 6th intercostal space on the anterior axillary line. A harsh systolic murmur was heard in the 3rd and 4th space in the left parasternal region. The second sound at the base was single and prominent. Triple rhythm was noted at the apex. The blood pressure was 110/60 mm. Hg.

The lungs were clear and no abnormal sound was present.

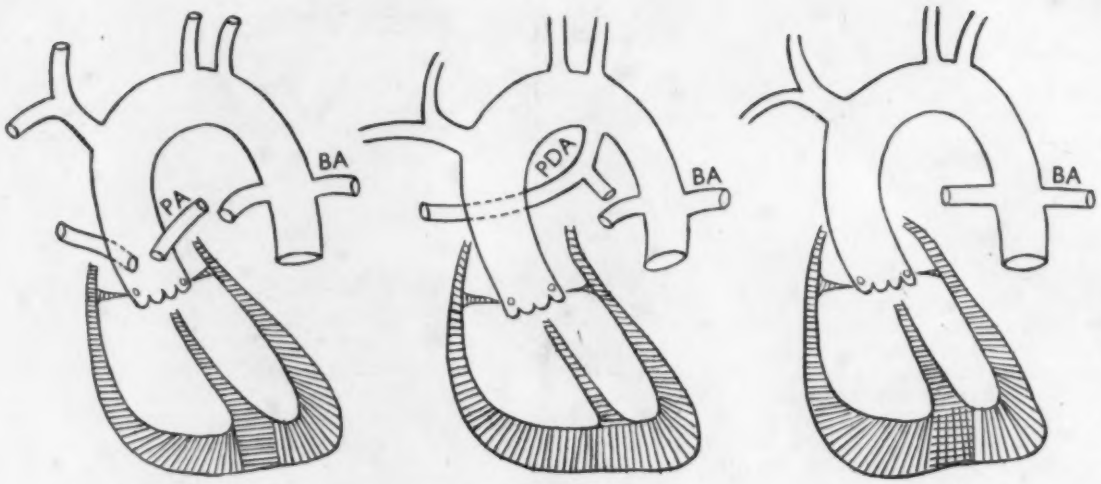
The liver was enlarged 1″ below the right costal margin. It was not tender. The spleen was not palpable.

Investigations—Blood : R.B.C.—6·8 million/c.mm. ; Hb.—72 per cent ; W.B.C.—11,900/c.mm. with polymorphs—46 per cent, lymphocytes—52 per cent and monocytes—2 per cent.

X-ray examination (A. P. view)—Heart enlarged ; typical *coeur en sabot* appearance ; absent pulmonary conus ; severe widening of the supracardiac shadow ; diminished vascularity of the lungs (Fig. 1, *vide* Plate).

E.C.G.—Sinus rhythm ; normal axis ; vertical lie ; P, pulmonale in lead II, AVF, V_2, V_3, V_5 ; right ventricular hypertrophy ; R—16 mm. in V_1.

Autopsy note—Heart grossly enlarged with both ventricles hypertrophied, the right much more than the left. A single vessel of abnormally large calibre arises from the heart (Fig. 2, *vide* Plate). There is a large defect at the base of the I.V. septum and the persistent truncus overrides this defect (Fig. 3, *vide* Plate), about $\frac{1}{3}$ to the left and $\frac{2}{3}$ to the right. There are four valves at the root of the truncus. Two coronary arteries arise from the root of the truncus. There is no pulmonary artery. Two bronchial arteries arising opposite to each other distal to the origin of the great



Type I Type II Type III

FIG. C—SHOWING COMPLETE VARIETY OF PERSISTENT TRUNCUS ARTERIOSUS (DIAGRAMMATIC)
PA—Pulmonary artery. PDA—Persistent ductus arteriosus. BA—Bronchial artery

vessel are the only supply to the lung, entering the hilum behind the bronchus.

DISCUSSION

Persistent truncus arteriosus is a rare congenital malformation. It results from failure of development of spiral aortopulmonary septum. As an integral part of the malformation there is also failure of development of the membranous part of the I.V. septum. The circulation to the lung may be altered and the supply may be carried out by pulmonary arteries arising from truncus or persistent ductus arteriosus from the arch or from the bronchial arteries from the descending aorta or any other aberrant arteries.

This case was suspected clinically as a case of persistent truncus arteriosus because of the history of dyspnoea and cyanosis from birth, gross clubbing of the fingers and from the skiagram of the heart showing enlarged heart, typical *coeur en sabot* appearance with gross widening of the supracardiac shadow.

There was, however, some disagreement as to the criteria for correct diagnosis of persistent truncus arteriosus in the past. In Abbott's series of 23 cases only 12 were accepted as true cases of persistent truncus arteriosus by Humphrey (1932). Lev and Saphir (1942) collected 12 additional cases and since then several other cases have been described by Doerr (1943), von Brown (1942), Marshall (1943), Webb (1946) and others. Humphrey's (1932) report contained a thorough review of the subject and her work received wide recognition. According to her classification the following are the diagnostic criteria :

1. Presence of a single large vessel arising from the heart and showing the combined features of aorta and pulmonary artery. The trunk shows 4 semilunar cusps.

2. Dextroposition of the truncus in the rider position above the I.V. septal defect, the greater part overlying the right ventricle with consequent hypertrophy of the right ventricle.

However two varieties of persistent truncus arteriosus have been described, viz., complete and partial.

1. *Complete variety* (Fig. C)—In this group there is no separate pulmonary trunk. The arterial supply to the lung may be maintained by one of the following types of vessels :

(a) Type I—Where the two pulmonary arteries arise independently from the truncus arteriosus proximal to the origin of the great vessel.
(b) Type II—Here the pulmonary arteries are absent and the blood supply to the lung is maintained by persistent ductus arteriosus arising from the arch of the aorta. This is due to complete absence or early involution of the ventral root of the 6th arch.
(c) Type III—In this group there is no derivative of the 6th arch and the pulmonary blood supply is maintained by the dilated bronchial arteries arising from the descending aorta distal to the origin of the great vessels.
(d) Type IV—The blood supply to the lung is carried out through the heterogenous arteries arising from the subclavian, intercostal, oesophageal, phrenic, common carotid arteries, etc.

In types I, II and IV, two sets of arteries enter the hilum, one in front and the other behind the bronchus, while in type III only one set, i.e., the bronchial artery, enters the hilum.

2. *Partial variety* (Fig. D)—In this variety a rudimentary septum delimits an abbreviated pulmonary trunk which gives off right and left pulmonary arteries. The main pulmonary artery therefore arises from the truncus arteriosus proximal to the origin of the great vessel.

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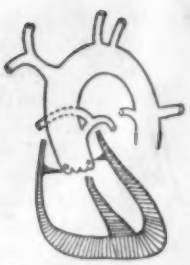

FIG. D — SHOWING INCOMPLETE VARIETY OF PERSISTENT TRUNCUS. A SMALL PULMONARY TRUNK ARISES FROM TRUNCUS PROXIMAL TO THE ORIGIN OF GREAT VESSELS (DIAGRAMMATIC)

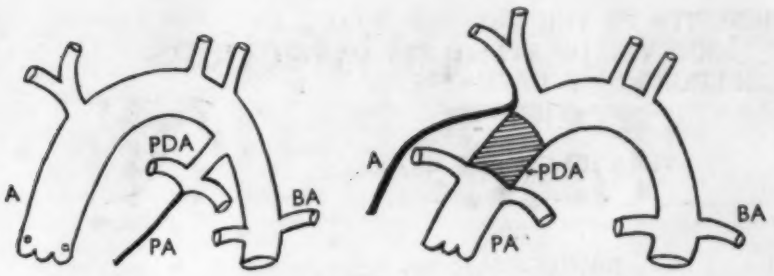

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FIG. E—SHOWING TRUNCUS SOLITARIUS AORTICUS (1) AND TRUNCUS SOLITARIUS PULMONALIS (2) (DIAGRAMMATIC)

A—Aorta. PA—Pulmonary artery. PDA—Persistent ductus arteriosus. BA—Bronchial artery.

According to the nature of the malformation the clinical feature will vary to some extent. After birth when respiration is established, pulmonary bed opens up and blood from the truncus flows to the lungs. If pulmonary arteries arise from this great vessel then there will be little defect to the pulmonary circulation and large amount of blood will be oxygenated. But due to admixture of venous blood coming from the right ventricle there will be some cyanosis which will be minimal.

If, on the other hand, derivatives of the 6th arch fail to develop, the only blood supply to the lung will be through the bronchial arteries. This collateral circulation will never be sufficient enough for oxygenation of the venous blood and cyanosis and dyspnoea will be maximum. The case reported here had severe cyanosis and gross dyspnoea and at autopsy it was found that the pulmonary artery was absent and two bronchial arteries arising opposite to each other distal to the origin of great vessels were the only supply to the lung. The heart was hypertrophied, specially the right ventricle, as the latter had to work against the systemic pressure.

It will be convenient to discuss two other more or less identical conditions which should be excluded before diagnosing the case as one of persistent truncus arteriosus. Clinically and radiologically these conditions very closely simulate each other and their differentiation is but a postmortem entity.

1. Truncus solitarius aorticus with pulmonary atresia (Fig. E, 1)—One must search carefully the rudimentary pulmonary arteries which look like a cord. The aorta, however, can be recognised by presence of the coronary orifices at its base and the orifice of the aorta is guarded by 3 semilunar cusps.

2. Truncus solitarius pulmonalis with aortic atresia (Fig. E, 2)—In this case the aorta is represented by a fine cord. The pulmonary artery enlarges in size and so also the ductus arteriosus which assumes an enormous size. There is no coronary ostea at the base of the great vessel.

The prognosis in these cases is extremely poor. Usually these patients die very early, within a few months. Of the cases reported in the literature most of them died within two months, excluding two of Humphrey's cases who survived up to 16 and 25 years. The case reported here died at the age of 7 years.

SUMMARY

One case of persistent truncus arteriosus with absent pulmonary arteries and hypertrophied bronchial arteries supplying the lungs is described.

The production of this malformation in regard to its development is discussed.

The criteria for diagnosis both clinically and on postmortem examination have been clarified so that confusion may be minimised from more or less similar abnormalities like truncus solitarius aorticus and truncus solitarius pulmonalis.

A short review of the literature has been given.

ACKNOWLEDGMENT

My thanks are due to Dr. S. C. Bose, Principal, Medical College, Calcutta, for kindly allowing me to report this case. I am also thankful to Dr. M. L. Biswas, Senior Visiting Physician (Paediatrics), for his kind help in preparing this paper.

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BENEFITS TO THE URINARY TRACT ON REMOVAL OF PELVIC PRESSURE REPORT OF A CASE OF CERVICAL FIBROID

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AND

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Much has been written and said about the injuries to the urinary tract in gynaecological operations. In fact Spencer Wells in 1882 confessed thus: "I do not yet see any mode of certainly providing against a mischance of tying or dividing one or both ureters. I feel that with all possible care it is an accident which may prove occasionally unavoidable. While that is true much attention has not been paid to the benefits that may occur to the urinary tract from pelvic surgery. Also the urinary tract pathology, seen postoperatively, may as well be an aftermath of pelvic pressure on the ureters existent prior to pelvic surgery." This point has been well stressed by Morrison (1960). Millin (1949) did not find any exhaustive statistics on the incidence of the upper urinary tract dilatation in pelvic inflammation and benign tumours, but on perusal of small series, he presented the following approximate figures:

TABLE 1—SHOWING THE INCIDENCE OF UPPER URINARY TRACT DILATATION IN CERTAIN PATHOLOGICAL CONDITIONS

Pathological conditions	Percentage incidence
Pelvic inflammatory condition	60
Fibroids (large)	60
Ovarian cyst	40
Fibroids (small)	30

In Morrison's (1960) series, the incidence of upper urinary tract dilatation was 34·1 per cent in cases of large pelvic tumour and 57 per cent in smaller tumours. 62·5 per cent of his patients returned to normal within three weeks of operation. In addition further 25 per cent of cases returned to normal in 12 to 18 months. In none of his cases the dilatation was so gross as in the case reported below.

CASE REPORT

Mrs. K. W., aged 35, para 4+0, was admitted on 26-2-1960, with the chief complaint of the presence of a mass in the lower abdomen for 2 years. The mass was first noticed after delivery and was mistaken for the puerperal uterus. However it persisted and there was no alteration in its size. The patient's periods were regular, with cycles of 30 days and lasted for five days with moderate flow. She had no urinary or bowel complaint.

The patient had had four full term normal deliveries. One girl and two boys of eleven, eight and five years respectively, were alive and well. Last child birth was two years ago. Delivery and puerperium were normal but the baby was rather small and died 10 days after birth. She had one miscarriage at five months, four years ago.

Examination and investigations—On examination, she appeared slightly anaemic. Blood pressure was 120/80 mm Hg, and pulse was 80 per minute. Cardiovascular and respiratory systems were normal. Abdominal examination revealed a firm suprapubic, mid-line, mobile, well defined mass with smooth surface and of the size of about 24 weeks pregnancy. There was no tenderness. There was no free fluid in the peritoneal cavity.

On vaginal examination, the cervix was found to be dilated and admitted two fingers. The left rim of the cervix was thinned out and soft. The right side of the cervix was replaced by a fibroid mass which protruded for about 5 cm. in the vagina and was continuous with the abdominal mass which reached the level of the umbilicus. The uterus was not felt separate from the mass.

On speculum examination, a pink mass arising from the right side of the cervix, about 2″ in diameter and with a smooth surface, was seen. There was no significant discharge. Diagnosis of cervical fibroid was made.

As pressure on the ureters was suspected, intravenous pyelography was done. This showed hydropelvis and hydroureter on the right side. Both ureters were displaced laterally. The right ureter had folded on itself. The radiologist made a diagnosis of a large intrapelvic soft tissue tumour with pressure hydronephrosis and hydroureter. (Fig. 1, *vide* Plate).

Other investigations revealed haemoglobin 9·4 g. per cent, R.B.C. 3·2 million/c.mm. The blood picture was normocytic hypochromic, W.B.C. 5,500/c.mm. with polymorphs 66 per cent, lymphocytes 30 per cent, monocytes 4 per cent. Blood sedimentation rate was 4 mm. in the first hour. Stool and urine examinations were normal. Blood urea was 30 mg. per cent. Urea clearance was 53·2 per cent.

The patient received iron and vitamin tablets by mouth, and imferon injections. Her haemoglobin improved to 11·8 g. per cent. She was operated on 15-3-1960.

Operative procedure—Pre-operative ureteric catheterisation was attempted by the urologist, but due to the kinking of the ureters by the fibroid, success was not achieved. On opening the abdomen a normal sized uterus was found to be sitting over a large cervical fibroid which was filling the pelvis. The left ovary was cystic and it was decided to remove it along with the left tube. The left infundibulopelvic ligament and the left round ligament were clamped, cut and ligatured. Then the right round ligament and the right tube and the right ovarian ligaments were clamped, cut and ligatured. It was decided to remove the cervical fibroid first by myomectomy, before getting at the uterine arteries, as otherwise they were not accessible. The loose peritoneum over the cervical fibroid was cut from one round ligament to another and was reflected downwards. The capsule of the fibroid was incised transversely and the fibroid was enucleated inside its capsule. Large blood vessels encountered during the procedure were clamped and cut. On removing the fibroid the large shell of the capsule was left behind. Uterine arteries were now visible and were clamped, cut and ligatured. Subtotal hysterectomy was performed, as it was thought that the ureters would be almost buried in the dilated cervix. The capsule of the fibroid was trimmed and the remaining cavity was obliterated with matress sutures. The dilated cervix which was continuous with the vagina without any line of demarcation was then closed.

Postoperatively, the patient made an uneventful recovery, except for slight bleeding per vaginum for two days, a fortnight after the operation. This was thought to be coming from the cervical stump and required no treatment.

Diagnosis—Leiomyoma, uterus. Interval phase, endometrium. Corpora luteum and albicans of the ovary.

Follow-up—Intravenous pyelography was repeated on 13-4-1960, i.e., 4 weeks after the operation. It showed no evidence of hydroureter (Fig. 2, *vide* Plate).

The patient was seen at the follow-up clinic on 24-6-1960. She had no complaints. The cervix had reformed and appeared normal.

Discussions

The ureters are well protected from pressure as they lie in the sheath of Waldeyer in the pelvic floor. However additional pressure by a large tumour at the level of the pelvic brim is more liable to cause hydronephrosis and hydroureter. In the case reported above, the ureteric dilatation is also more marked above the level of the pelvic brim and simulates the changes caused by a gravid uterus.

Complete disappearance of the hydronephrosis after the removal of the tumour is in conformity with the finding of Long and Montgomery (1950) and Chamberlin and Payne (1944), who also reported complete regression of these changes on the removal of the benign pelvic tumours.

Poor visualisation of the urinary tract in the post-operative intravenous pyelography film as compared to preoperative films, was also met with by Chamberlin and Payne (1944). This is explained on the basis that the dye just runs out fast once the obstruction is relieved.

Cervical fibroids are notorious for causing technical difficulties in their removal on account of the close proximity to the ureters. The problem is simplified when the ureteric catheters can be passed. However the tumours cause so much kinking of the ureters that even that becomes a formidable procedure. Hence the ureters remain exposed to trauma during the operative procedures, unless due care is taken to protect them. Dissection inside the capsule is imperative. This is the one occasion where one need not be overzealous and persist in removing the dilated and stretched cervix with the ureters almost buried and thus cause injury to the ureters. When the cervix has to be removed in these cases it is better to dissect the ureters clear first. With these precautions, improvement in the renal function is achieved and the ureteric trauma is avoided.

Summary

1. An interesting case of a large cervical fibroid, causing gross ureteric dilatation, with disappearance of hydroureter and hydronephrosis on removal of the tumour, is presented.

2. Technical difficulties in removing these tumours are discussed.

3. Literature on the subject is reviewed.

Acknowledgment

Our thanks are due to Dr. P. K. Malkani, Professor of Obstetrics & Gynaecology, All-India Institute of Medical Sciences, for reviewing this paper, to Dr. R. L. Mehra, Medical Superintendent, All-India Institute of Medical Sciences Hospital, for permission to report the case and to Miss L. G. Ramchandani for secretarial assistance.

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JOURNAL OF THE
INDIAN MEDICAL ASSOCIATION

CALCUTTA, JULY 16, 1961

MORTALITY AND MORBIDITY STATISTICS IN ASSESSMENT OF HEALTH STATUS

For assessment of health and often for evaluation of health services, health administrators have recourse to data of vital statistics particularly the death rates, crude and specific. From the registered deaths in India it would appear that the death rate has fallen rapidly from 24 per mille to as low as 12 during a span of 13 years (1944-57). There is plenty of reason for complacency due to the steady fall of death rates from 1947, the year of Independence. Of course, the statisticians will seriously criticise the reliability of such data on account of their incompleteness. A high percentage of omissions has been noted by various surveys. Omissions can therefore be estimated.

A downward trend in the death rate has also been projected by the Central Statistical Organisation in the draft Third Five-Year Plan. It is doubtful if any clue can be extracted from such data for health planning for which a comprehensive health picture is necessary.

Be that as it may, the downward trend of death cannot be ignored. How about the health condition of the people? Have the people gained health correspondingly?

As defined by W.H.O. "Health is a state of complete physical, mental and social well-being, not merely freedom from disease or infirmities."

How to assess such conditions in the individuals? Persons classed as healthy and fit to discharge their respective duties may not satisfy the conditions laid down in this definition. But the nation is interested to have them in the minimum individuals to discharge their duties or, in other words, is interested in her man-power.

In spite of the reduction in the death rate, hospitals in both urban and rural areas are found to be more crowded and there is a great demand for more beds in the hospitals. A large section of people, on the other hand, does not go for modern medicine either for poverty or for some other reasons. They also remain sick and contribute towards reduction of man-power of the nation. Government has been trying to extend health services to the remote villages along with other development schemes. Whether sickness is being reduced or not cannot be stated or assessed correctly unless the nature of sickness with cause and duration of illness of the sick persons are reported, recorded and compiled.

For a better and more comprehensive health picture of a country, morbidity or sickness data are an essential requirement. The real source of such data is the physician who treats the patient in hospital, clinic, private chamber or patient's home. But except for a few communicable diseases which are notifiable in certain states it is not obligatory on the physician to report occurrence of illness to the health authorities. Unfortunately very few physicians take the trouble of reporting even the occurrence of notifiable diseases. It is no good putting the blame on physicians only. Are the authorities insisting on such reporting? The situation about communicable disease has therefore to be assessed from the available death records from which it is very difficult to estimate the number of people suffering due to the constant changing of disease pattern in the community. Thus the information about loss of man-power, loss of earning and various handicaps resulting from illness are always wanting in this country. Hospitals and clinics, as already pointed out, provide dependable morbidity data. But they are always of desparate and scattered nature, because there is no fixed area or population allotted to a hospital. If a proper recording system is introduced in the hospitals with the purpose of analysis and interpretation, the hospital data can not only be utilised for determining the prevalence of morbidity but may also serve as a base for medical research.

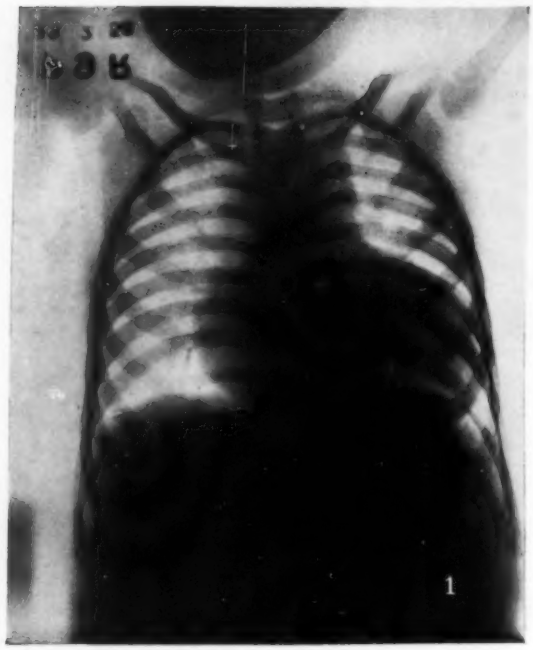
Though important the sickness records at the present moment are not only incomplete but are hardly obtainable in a form permitting compilation, analysis and interpretation for presenting the health status of the people.

To overcome the situation an all-India planning is necessary for introducing (1) reporting system by the physicians, (2) uniform recording system in hospitals and clinics, and (3) general health survey which the Government of India have already adopted for assessing health status of certain localities.

Data collected through surveys are in many respects more dependable and easier for analysis and interpretation. As such, until satisfactory reporting and recording systems are introduced the country has to depend on survey methods, particularly for morbidity statistics. This is considered of great utility particularly at the time when the country is passing through plan periods with various development schemes including those of health services and when evaluation and assessment of services rendered would be considered necessary for obvious reasons.

Fig. 1—Showing granulomatous ulceration of the mucous membrane of the hard palate and lips. Fig. 2—Showing extensive ulceration of glans penis, extending to the shaft, pubis and upper part of scrotum. Fig. 3—Showing granulomatous ulceration of the coronal sulcus, penile shaft and medial part of left groin. Fig. 4—Showing ulceration around the coronal sulcus and in the right groin.

Fig. 5—Showing multiple ulcers in both groins and the pubic region. Fig. 6—Showing vitiliginous scars in the region of the destroyed penile shaft and in the pubic region, ulceration with wavy border of the left scrotocrural junction and of scrotum and pseudoelephantoid condition of the scrotum. Fig. 7—Showing destructive perianal ulceration extending forwards into the perineum as well as backwards.



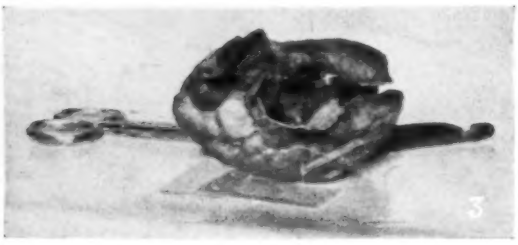
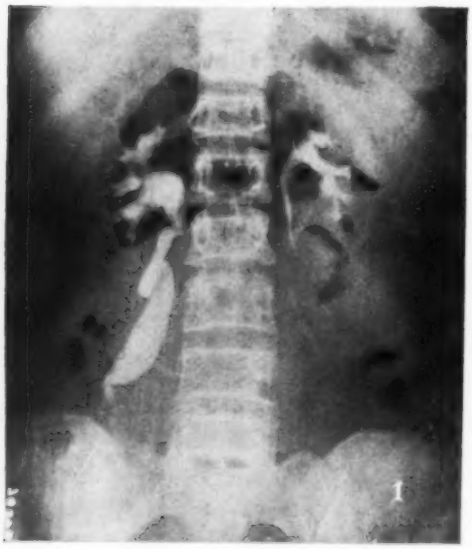


Fig. 1—Skiagram of chest (A.P. view) showing enlarged heart, absence of pulmonary conus, widening of the supracardiac shadow and diminished pulmonary vascularity. Fig. 2—Showing a single vessel of large calibre arising from the heart. Fig. 3—Showing a single orifice of persistent truncus arteriosus through which is seen the interventricular septum.

KHATUA—*Persistent Ductus Arteriosus* (*p. 74*)



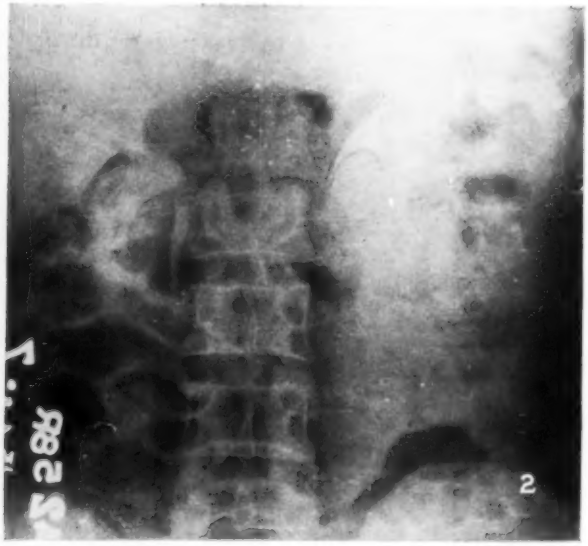


Fig. 1—Preoperative intravenous pyelography showing hydroureter and hydropelvis on the right side, lateral displacement of both ureters and intrapelvic tumour. Fig. 2—Intravenous pyelography 4 weeks after removal of the tumour showing normal urinary tract with rather poor visualisation as compared to Fig. 1.

HINGORANI AND KAUR—*Benefits to the Urinary Tract on Removal of Pelvic Pressure* (*p. 78*)

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GENERAL PRACTICE DIGEST

CLINICAL INVESTIGATION AND MANAGEMENT OF OCCLUSIVE CEREBROVASCULAR DISEASE

Clinical Investigation

In cerebrovascular accident or 'stroke' a careful history is essential for correct diagnosis. Vascular diseases of the brain have three types of onset, viz., (1) catastrophic (embolism, haemorrhage, and rarely sudden thrombosis), progressive (thrombosis) or of a stuttering type (vascular insufficiency). Previous episodes, often transient, suggest atherosclerotic stenosis with transient ischaemic attacks. The accompanying symptoms are also important. Chest pain suggests associated myocardial infarction, abdominal pain and melaena suggest gastro-intestinal bleeding as a precipitating episode; precipitation of the episode by coughing or straining at stool is also important. The type of headache is often suggestive. In cerebral haemorrhage the headache is intense with accompanying stiffness of the neck; in carotid insufficiency, the headache is temporal and usually on the side of the ischaemia; in basilar artery insufficiency, the headache is occipital or sub-occipital.

Previous transient hemiparesis, hemiparasthaesias, dysphasias, transient monocular blindness (in carotid artery insufficiency), episodic vertigo, ataxia, photopsia, hemianopsia, blindness and quadriparesis (in vertebral basilar artery insufficiency) should be enquired into. The past medical history often furnishes information regarding associated hypertension, diabetes and heart disease.

A complete medical evaluation should include cardiac and pulmonary status. In assessing the possible causes of decreased cardiac output, the presence of pulmonary congestion, pneumonitis or emphysema should be noted. The skin and tongue often give us a warning of dehydration. Pulses in the neck and extremities should be palpated and auscultation should include the neck and head (for carotid and vertebral bruits). The blood pressure should be recorded at least once daily. The condition of the retinal vessels should be noted.

Neurological investigation should include examination for stiffness of the neck (subarachnoid haemorrhage), the mental state (orientation, ability to speak, comprehend, write or calculate). Where possible the gait should be tested. Any papilloedema and the state of the visual fields should be noted. The state of all cranial nerves, motor strength of the extremeties—the tone and coordination including cerebellar signs should be recorded. The reflexes, including the sucking and grasp reflex should be tested, and sensation examined.

Lumbar puncture should be a routine procedure unless papilloedema is present. In acute cerebral infarction or haemorrhages near the meninges or ventricles the W.B.C. count in the C.S.F. fluid may be as high as 2,000 per c.mm. with preponderance of polymorphs. Usually there are only a few cells. A large number of R.B.C. indicates haemorrhagic infarction or haemorrhage.

A roentgenogram is important for noting the size of the heart, any pneumonitis, or possibly primary or secondary carcinoma. Cerebral metastasis may mimic vascular disease of the brain. A routine x-ray examination of spine should be made of the cervical spine (for cervical spondylosis) and skull (or noting calcification of intracranial vessels or evidence of unsuspected tumour).

Routine electrocardiogram should be made for detecting myocardial infarction or cardiac dysrhythmia.

An electroencephalogram may suggest insufficiency in the distribution of the internal carotid artery. If the electrocardiogram becomes worse during carotid compression and rotation of the head, this suggests vertebral artery disease.

In occlusion of the carotid artery or in diffuse occlusive vascular disease the retina blanches easily when the globe is compressed on the involved side.

A complete blood count is necessary. A high haematocrit and R.B.C. count suggests polycythaemia vera or secondary erythrocythaemia and haemoconcentration due to dehydration. The above two conditions increase viscosity of blood and predispose to cerebral thrombosis. Polymorphonuclear leucocytosis accompany severe cerebral haemorrhage and infarction. Urinalysis may reveal diabetes, embolic infarction of the kidneys or suggest the presence of renal hypertension. The fasting blood sugar indicates diabetes mellitus, unless there is infarction in the region of the 3rd or 4th ventricles (central origin). Blood urea nitrogen may reveal complicating renal insufficiency. Serum cholesterol indicates any metabolic cause of atherosclerosis. Blood culture is necessary in all cases with cerebral embolism and rheumatic heart disease.

Angiography is sometimes necessary in doubtful cases or where a surgically remedial lesion is suspected. Angiography should be performed under local anaesthesia, for general anaesthesia may lower the blood pressure and produce haemodynamic crisis with cerebral infarction. Diodrast is contraindicated because it is irritating to the vascular endothelium. Diatrizoate is recommended for this purpose. Pneumoencephalography is contraindicated in cerebrovascular disease, because the resulting hypotension may produce severe neurologic deficit.

Management of Cerebral Thrombosis

The patient should be placed flat in bed with the head end low. Either a thin pillow or none should be recommended. Comatose and semistuporous patients need turning from side to side every two hours. Excessive rotation of the head should be avoided, as such procedure may compress or stretch the vertebral arteries in the neck.

Reddened skin over the heels, ankles, buttocks, shoulders and elbows are signs of impending pressure necrosis (decubitus ulcers). Paralysed limbs should have full range of passive motion daily (special attention being given to abduction of the shoulder joint in hemiplegic patients. This will prevent contractures and 'frozen joints.'

For preventing dehydration and hypoglycaemia, intravenous fluids should be given for the first 48 hours. Thereafter, if the patient cannot swallow oral feedings, nasogastric feeding should be given in small (200 ml. in divided amounts) aliquots every two hours. Frequent small feedings do not produce regurgitation and aspiration.

The blood pressure should be maintained at the optimum level. If shock is present blood transfusion and noradrenaline should be given because the most important factor in the maintenance of cerebral circulation is the cardiac output. In formerly hypertensive patients whose blood pressure has fallen to normal levels and in subjects with intermittent heart block, ephedrine administered in doses of 25 to 50 mg., three or four times daily is recommended. Transient neurological symptoms sometimes occur in severe hypertension, due to spasm of cerebral vessels. The systolic blood pressure should be continuously lowered to approximately 180 mm. Hg.

Treatment with reserpine, diuril and apresoline, together with bed rest and barbiturate sedation has been found effective. In case of heart failure digitalis therapy is indicated. Auricular fibrillation and other cardiac dysrhythmias may also precipitate thrombosis of cerebral vessels. In such cases, improved cardiac output from the use of quinidine and procaine amide may be helpful. In cases of cerebral thrombosis caused by blood loss (e.g. in surgery, gastro-intestinal haemorrhage) blood transfusion and prevention of further bleeding are essential.

In severe cerebral infarction, oxygen therapy with intermittent use of 5 per cent carbon dioxide is recommended. The oxygen tends to decrease cerebral anoxia and the carbon dioxide increases cerebral blood flow.

Incontinent patients require sterile indwelling catheters and bowel care, dampness and infection predispose to the formation of decubitus ulcers. Care should be taken to prevent infection of urinary tract, by keeping catheters, their connections and urinary drainage bottles absolutely sterile, and by giving appropriate antibiotics at the first appearance of pyuria.

Treatment of episodic cerebrovascular insufficiency—Resection of the proximal plaques in the large cerebral vessels or long-term anticoagulant therapy appears to be useful. The most common form of haemodynaemic crisis is due to a fall in blood pressure, sometimes resulting from unwise use of hypotensive drugs in hypertensive patient, or to postural hypotension particularly in diabetic subjects. In such cases simple discontinuance of the hypotensive drugs or giving ephedrine sulphate (25 to 50 mg., three to four times daily) may minimise or abolish the attacks. Administration of sympathomimetic drugs, weight reduction, and increasing muscle tone by exercise may abolish postural hypotension. Atropine is of some value in carotid sinus sensitivity, but surgical denervation or resection of the sinus, if the vessel is completely thrombosed, may terminate the episodes. Avoidance of excessive blood loss is recommended particularly if the subject with cerebrovascular disease is undergoing surgery. Lumbosacral sympathectomy should also be avoided. Precaution is necessary in allowing patients to stand for the first time after reconstruction of atherosclerotic iliac and femoral arteries.

The accompanying convulsive disorder is followed by episodic hemiplegia in subjects suffering from cerebrovascular disease. Here anticonvulsant treatment may abolish the attacks. In atherosclerotic diabetic subjects receiving insulin therapy, hypoglycaemia may precipitate focal neurological signs which can be promptly relieved by administration of glucose.

Anticoagulant therapy—The ideal condition for anticoagulant therapy is one in which ischaemia has provoked minimal symptoms and the collateral circulation is sufficient to maintain viability but not function of tissue.

Anticoagulant therapy with heparin in the acute stages and dicoumarol for long-term purposes is useful in occlusive cerebrovascular disease. Such treatment is intended for reducing the incidence of forward embolisation from proximal plaques of the cerebral vessels in the neck. Anticoagulant drugs also prevent adhesiveness of the blood elements. Neithef heparin nor dicoumarol can dissolve a fibrin clot, once it has formed; this requires fibrinolysin.

The contraindications to anticoagulant therapy include suspicion of intracerebral or intracranial bleeding, and potential sites of bleeding elsewhere, e.g. peptic ulcer and recent abdominal surgery. Severe liver disease is also a contraindication. In severely hypertensive patients, the systolic blood pressure should be lowered to approximately 180 mm. Hg before anticoagulant therapy. Xanthochromia of the cerebrospinal fluid and presence of erythrocytes in excess of 3,000/c.mm. has also been accepted as a contraindication.

Patients under long-term anticoagulant therapy must report twice a month for prothrombin determinations. Unreliable, demented and uncooperative patients should not receive anticoagulant therapy unless they are under close medical supervision. In elderly patients an unpredictable response to dicumarol is occasionally encountered for unknown reason. In such cases vitamin-K is given. But if abnormal response occurs repeatedly after therapeutic trial, anticoagulant therapy must be abandoned.

—From an article by John S. Meyer, *Am. J. Med.*, **30**: 577, 1961.

CURRENT MEDICAL LITERATURE

Chronic Liver Disease in Young People

WILLCOX, R. G. AND ISSELBACHER, K. J. (*Am. J. Med.*, **30**: 185, 1961) from the Departments of Medicine, Harvard Medical School and Massachusetts General Hospital, Boston, Massachusetts, in giving a review of the clinical features and course of twenty-two female and eleven male patients with chronic liver disease, manifest before age twenty-two observe: The clinical features were similar in both groups, except that recurrent febrile episodes, acne and striae were more prominent in the female patients and oesophageal varices more common in the male patients. Arthralgia was

noted in 36 per cent of the females and in 27 per cent of the male patients. Ulcerative colitis was present in seven patients; in five of these it appeared after the onset of the liver disease.

In general the prognosis was poor. Twenty of the twenty-two female patients and seven of the eleven male patients have died. The average duration of the disease in those who died was three and a half years in the female patients and five and a half years in the male patients.

Liver function was markedly impaired in all patients. The serum globulin levels were elevated, but were significantly higher in the young female patients as compared either to the young male patients or to older patients with chronic liver disease. L.E. cell tests were performed in four patients and results appeared to be positive in two. The histologic diagnosis of the liver disease in thirty of the patients was postnecrotic cirrhosis.

Viral hepatitis appears to have occurred in some of these patients. The concept that the hepatitis virus or other agents may have caused the chronic liver disease by autoimmune mechanisms is discussed. The clinical course of the thirty-three patients did not differ from that of published cases of chronic liver disease with L.P. cells, referred to by some as 'lupoid hepatitis'.

The L.E. cells probably are a manifestation of immune or allergic processes. Rather than implying a separate aetiology, the presence of L.E. cells in some patients with chronic liver disease may only be a reflection of the intensity of the search for these cells or the level of the L.E. factor.

In the present series of thirty-three young patients with chronic liver disease, we have found no consistent clinical or laborotory features that warrant a definite separation of any of these cases into a clinical entity.

Suction Biopsy of the Gastric Antrum

HEINKEL, K., HENNING, N. AND ELSTER, K. (*German M. Monthly*, **6**: 75, 1961) from the Department of Medicine and the Institute of Pathology, University of Erlangen, write:

Suction-biopsy specimens from the gastric antrum were obtained in 234 patients. In 23 per cent of patients the characteristic pattern of fundic mucosa could be demonstrated (prepyloric position of gastric tube checked radiologically). Chronic inflammatory changes of the antral mucosa were frequent and of rather severe degree. Subepithelial haemorrhage apparently was of little diagnostic significance. Even where the glandular pattern resembled that of the fundus, the muscularis mucosae were often broken up.

Tomography in Mitral Stenosis

DULFANO, M. J. AND ADLER, H. (*Circulation*, **23**: 177, 1961) from the Cardiopulmonary Laboratory, Beilinson Hospital, Petah Tikva, and the Radiology Department, Meier Hospital, Kfar Saba, give in the following lines the summary of their observations on tomography in mitral stenosis:

The haemodynamic findings in 31 patients with mitral valvular disease were correlated with the signs obtained by chest tomography. The normal and pathologic findings are described. The advantages of the tomographic technique for the study of the pulmonary vasculature are pointed out.

The progression of mitral valve narrowing was considered to be best related to the integrated picture of 'impaired venous drainage.' On this basis, three stages were defined.

The over-all response of the pulmonary circulation to the severity of the disease can be judged by the pattern of blood vessels filling throughout the lung.

It is concluded that for the evaluation of mitral valvular disease routine tomographic technique can indicate many of the essential haemodynamic findings with less hazard than either angiography or cardiac catheterisation.

Essential Hypertension and Aldosterone

VENNING, E. H., DYRENFURTH, L., DOSSETOR, J. B. AND BECK, J. C. (*Circulation*, **23**: 168, 1961) from the McGill University Clinic, Royal Victoria Hospital, Montreal, Canada, write:

Serial determinations of the urinary excretion of aldosterone have been made in hypertensive patients. Although the majority of patients with benign essential hypertension excrete amounts of aldosterone within the normal range, the mean excretion of 26 patients was significantly higher than that observed in normotensive individuals. When renal complications were present, the mean excretion was still further increased and in patients with malignant hypertension all the values were above the normal range.

The mean excretion of the tetrahydro metabolite of aldosterone was also found to be higher in patients with essential hypertension.

These patients have a normal response to adrenocorticotrophic hormone stimulation, urinary and plasma corticosteroids, as well as urinary aldosterone, showing comparable increases.

The aldosterone content of adrenal glands obtained post mortem from two patients with malignant hypertension was within the range observed by other investigators in primary aldosteronism.

Hypothalamic-Pituitary Sarcoidosis

SHEALY, C. N., KAHANA, L., ENGEL, F. L. AND MCPHERSON, H. T. (*Am. J. Med.*, **30**: 46, 1961) from the Department of Medicine, Division of Endocrinology, Duke University Medical Centre, Durham, North Carolina, in presenting four cases of sarcoidosis with hypothalamic and/or pituitary gland hypofunction observe:

The spectrum of manifestations has been discussed and inferences as to the site of the lesions offered. The importance of searching for sarcoid in cases presenting as idiopathic hypopituitarism and/or diabetes insipidus is stressed. Elevated cerebrospinal fluid protein, without other prominent cerebral symptoms, occurred in three patients all of whom had diabetes insipidus. This finding may be of considerable diagnostic value. Regression of diabetes insipidus occurred in one patient treated with steroids.

CURRENT TOPIC

MEDICAL COUNCIL OF INDIA

The following is from the Presidential Address by Dr. C. S. Patel, at the Fifty-fifth Session of the Council held on 24th April, 1961 :

As you may be aware the Council has not yet been recomposed with full membership since a few of the members from the Registered Graduates Constituencies have as yet not been elected. The following States have yet to send their representatives : 1. Madhya Pradesh, 2. Mysore, 3. Bihar, 4. Rajasthan, 5. Gujarat.

Since the last meeting there has been one change in the list of members. Dr. A. K. Sen, who was representing the Patna University on this Council ceased to be a member under Section 7 (c) of the Indian Medical Council Act, 1956, as a result of passing of the Bihar State Universities Act. It is my earnest hope that all the vacant seats would be filled up soon to enable the Council to have the advice and guidance of all the members.

I have great pleasure in informing you that this Council has been honoured in no mean measure by the awards made by the President of India on Republic Day, this year. Dr. B. C. Roy, Chief Minister of West Bengal, a Founder Member of this Council and a past President has received the award of 'Bharat Ratna', the highest honour that could be conferred by the President of India, to any citizen of India, for his meritorious and outstanding services to the country. He has ever been among the select distinguished galaxy of eminent men of India; that group of selfless, earnest and devoted humanitarians and statemen—the gems of India who have a cherished place in the heart of every man.

Dr. T. N. Banerjee, a former member of this Council and Executive Committee has been awarded the 'Padma Bhusan' for his meritorious services to the nation, a reward highly merited and long overdue. I am sure all of you will join me in offering our heartiest and sincere congratulations to Dr. B. C. Roy, who is here now in our midst and to Dr. T. N. Banerjee, who is enjoying a well-earned rest at Patna.

Inspection and Visitations

Since my last report to you on 5th November, 1960, the following Under-graduate Inspections have been carried out :

1. Bangalore Medical College, affiliated to the Mysore University for purposes of recognition.
2. Jabalpur Medical College, affiliated to the Jabalpur University for purposes of recognition.
3. Kurnool Medical College, affiliated to Sri Venkateswara University for purposes of recognition.

The last two colleges are affiliated to new universities and the degrees have not yet been included in our Schedules. The reports of the Inspectors and the observations of the Universities will be placed before you in due course. Also M.D. (Pharmacology) granted by the Bihar University has been inspected.

The following qualifications have been recommended by the Executive Committee for inclusion in the first Schedule to the Indian Medical Council Act, 1956. The reports along with the observations of the universities and the recommendations of the Executive Committee are being placed before you for your consideration :

1. M.D. (Obst. & Gyn.) M.S. (Obst. & Gyn.)	Bihar University in respect of students trained at the Darbhanga Medical College, Laheriasarai.
2. M.D. (Medicine) M.D. (Pathology) M.D. (Pharmacology) M.S. (Surgery)	Poona University in respect of students trained at the B.J. Medical College, Poona.
3. D.O.M.S.	Vikram University in respect of students trained at M. G. M. Medical College, Indore.

Besides, the following inspections are being arranged during this year :

1. Medical College, Pondicherry, affiliated to the Madras University for purposes of recognition.

2. Bankura Sammilani Medical College, affiliated to the Calcutta University for purposes of recognition.

3. Kasturba Medical College, Manipal/Mangalore, affiliated to the Karnatak University for purposes of recognition by the General Medical Council of United Kingdom.

Periodical inspections of the Undergraduate Courses of the Universities of Delhi and Patna are being arranged for this year.

I have again and again referred to you of the difficulties we have in securing inspectors for the various undergraduate and postgraduate examinations. The inspections are increasing year by year as a result of the number of new medical colleges that are being opened and also the number of additional postgraduate qualifications being started in the various Universities in India. At my instance, a circular letter and a proforma was issued to all the teachers in the various medical colleges in India to submit their qualifications and experience, both as teacher and as examiner for being considered for the panel of approved inspectors. At my suggestion your Executive Committee formed a sub-committee consisting of Drs. B. Narayana, B. B. Bhatia and myself to scrutinise the proformas and to compile a list of inspectors. Further, at my insistence this committee has also been entrusted with the task of nominating inspectors for the various inspections henceforward. The Sub-committee met early in March and have prepared a list of Inspectors in the various subjects and also nominated the inspectors for the various undergraduate and postgraduate examinations to be held during this year.

Visitations of the Bikaner Medical College, Rajasthan, Burla Medical College, Orissa, and the Medical College, Srinagar, have also been arranged for. These visitations will help the authorities concerned to develop their

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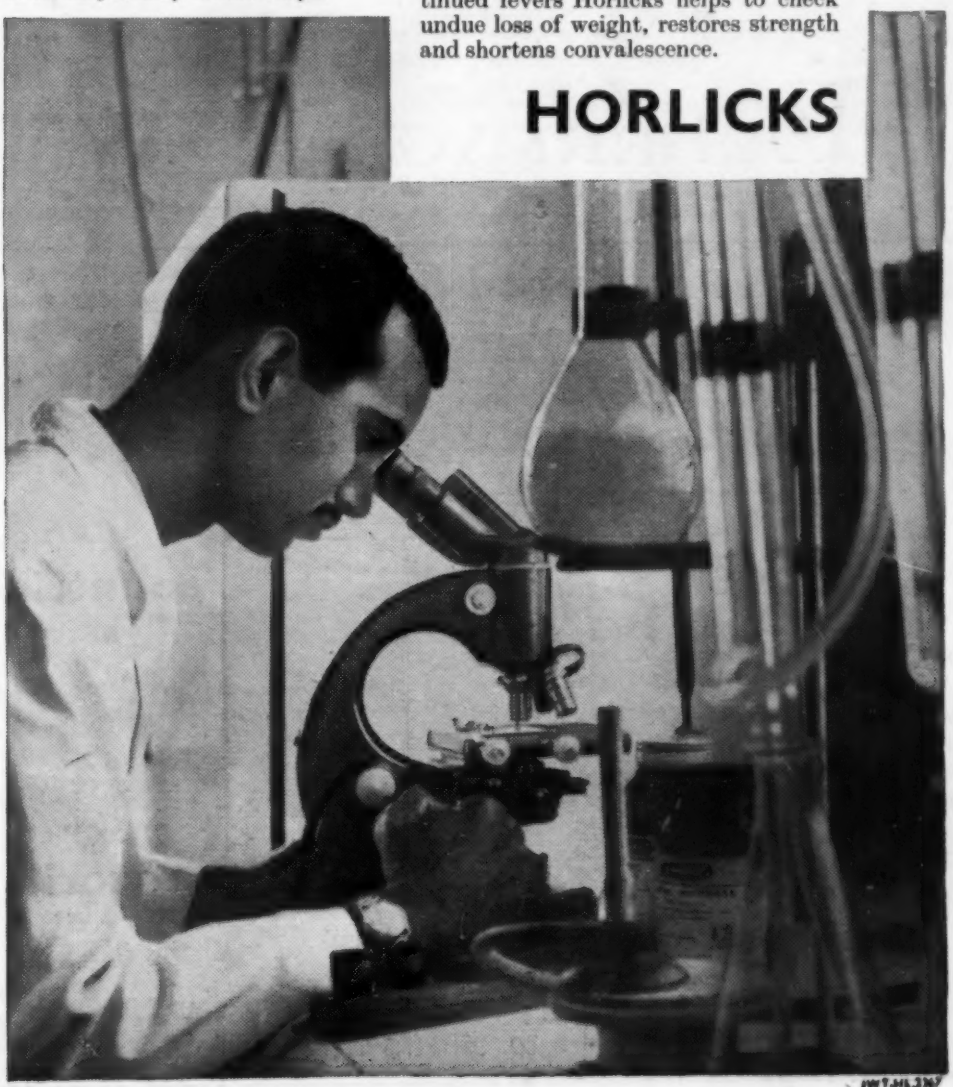

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During the year, the Inspection reports of (1) M.G.M. Medical College, Indore and Medical College, Gwalior affiliated to the Vikram University; (2) the Ludhiana Medical College and the Patiala Medical College affiliated to the Panjab University and (3) Guntur Medical College, affiliated to the Andhra University were forwarded to the General Medical Council of United Kingdom for purposes of recognition.

I am glad to inform you that the General Medical Council has recognised both the colleges affiliated to the Vikram University, and the Ludhiana Medical College, affiliated to the Panjab University. They have provisionally recognised the Patiala Medical College and have requested for further inspection reports after about 3 years. As regards Guntur Medical College, they have postponed consideration pending receipt of further inspection reports. The Executive Committee has therefore, decided on a fresh inspection of the Guntur Medical College and this will be arranged during this year.

Inspections of the following postgraduate qualifications are also being arranged for this year :

1.	Agra University (March/April, 1961)	T.D.D.
2.	Poona University (March, 1961)	D.C.P.
3.	Bihar University (December, 1961)	i. M.D. (Physiology) ii. M.D. (Preventive & Social Medicine).
4.	Gauhati University (April, May, 1961)	i. M.D. (Medicine) ii. M.S. (Surgery) iii. M.S. (Ophthalmology) iv. M.S. (Oto-Rhino-Laryngology) v. M.O.
5.	Gujarat University (October, 1961)	i. M.Sc. (Med.) (Pharmacology) ii. M.D. (Pharmacology) iii. D.G.O. iv. D.L.O. v. D.Ped. (Pediatrics) vi. D.V.D. vii. T.D.D. viii. D.P.H. ix. D.A. x. D.O.M.S.
6.	Andhra University (April/May, 1961)	i. D.A.
7.	Baroda University (March/April, 1961)	i. M.D. (Obstetrics & Gynaecology) ii. M.Sc. (Pothology) iii. M.Sc. (Anatomy) iv. D.O. v. D.G.O. vi. D.V.D.
8.	Lucknow University (March/April, 1961)	(G.S.V. Medical College) M.D. (Pharmacology)
9.	Vikram University (April, 1961)	M.D. (Pediatrics)

The Government of India have issued a notification recognising the following postgraduate qualifications :

Bombay University.	
Doctor of Medicine (Tuberculosis)	M.D. (Tuberculosis) Bombay.
Master of Sciences in (Pathology)	M.Sc. (Pathology) Bombay.
Doctor of Medicine (Midwifery)	M.D. (Mid.), Bombay.
Master of Surgery (Oto-Rhino-Laryngology)	M.S. (Oto-Rhino-Laryngology) Bombay.
Diploma in Ophthalmology	D.O., Bombay.
Lucknow University.	
Diploma in Orthopaedics	D.O. (Orthopaedics) Lucknow.
Diploma in Tuberculosis Diseases	D.T.D., Lucknow.
Andhra University.	
Diploma in Ophthalmology	D.O. (Ophthalmology) Andhra.
Diploma in Gynaecology & Obstetrics	D.G.O., Andhra.
Doctor of Medicine (Medicine)	M.D. (Medicine) Andhra.
Doctor of Medicine (Pathology & Bacteriology)	M.D. (Path. & Bact.), Andhra.
Doctor of Medicine (Obstetrics & Gynaecology)	M.D. (Obst. & Gyn.), Andhra.
Doctor of Medicine (Pharmacology)	M.D. (Pharm.) Andhra.
Doctor of Medicine (Bacteriology including Pathology)	M.D. (Bact. including Pathology) Andhra.
Master of Surgery (E.N.T.)	M.S. (E.N.T.) Andhra.
Agra University.	
Diploma in Child Health	D.C.H., Agra.
Bihar University.	
Doctor of Medicine (Pathology)	M.D. (Pathology) Bihar.
Master of Surgery (Anatomy)	M.S. (Anatomy) Bihar.
Doctor of Medicine (Medicine)	M.D. (Medicine) Bihar.
Master of Surgery (Surgery)	M.S. (Surgery) Bihar.
Poona University.	
Doctor of Medicine (Midwifery)	M.D. (Midwifery) Poona.
Gujarat University.	
Master of Surgery (General Surgery)	M.S. (Genl. Surgery) Gujarat.

Doctor of Medicine (Medicine & Therapeutics)	M.D. (Medicine & Therapeutics) Gujarat.
Doctor of Medicine (Obstetrics & Gynaecology)	M.D. (Obst. & Gyn.), Gujarat.

Rajasthan University

Master of Science in Medical Anatomy	M.Sc. (Medical Anatomy) Rajasthan.

(This qualification shall be recognised medical qualification only when granted on or after the 1st July, 1957).

Rajputana University.

Master of Science in Medical Anatomy	M.Sc. (Medical Anatomy) Rajputana.

Baroda University.

Diploma in Anaesthesia	D.A., Baroda.
Doctor of Medicine (Pathology)	M.D. (Path.) Baroda.
Diploma in Oto-Rhino-Laryngology	D.L.O., Baroda.

Although this Council has been recommending recognition collegewise and have also submitted necessary amendments to the Indian Medical Council Act, 1956, the Government are still continuing to recognise these qualifications university-wise. In reference to a recent communication from the Ministry of Health, the Executive Committee has again reiterated the previous decision of the Council and emphasised that qualifications be recognised collegewise in order to distinguish between approved and unapproved colleges.

The present curriculum which is in vogue was revised in 1952. When this was being discussed in the Council, I made it clear that we would have to revise this curriculum every 5 years in view of the rapid advances that medicine has been making in almost all its branches. The Council, therefore, resolved to appoint a Committee to revise the curriculum for undergraduate medical education. Keeping this in view information was collected from various medical colleges and universities as regards the modifications to the present curriculum to suit the changing time. Various suggestions were received for bringing out changes in the curriculum.

The Committee that was appointed by the Council for the revision of the curriculum considered in detail the views received from the various universities and medical colleges and after a great deal of discussion and deliberation, adopted certain modifications and prepared the revised draft for the new curriculum. This draft was considered by the Executive Committee and their recommendations have been forwarded to all of you as well as to the universities and medical colleges for eliciting their opinion. It may be pointed out here, that a great deal of care has been exercised in changing the curriculum from every angle in accordance with the modern trends prevailing in medical education all over the world and every effort has been made to see that what is best for the advancement of medical education has been included, keeping in view the progress that has been made in medicine. Special attention has been given to conditions and circumstances peculiar to this country in its changing phase of economic and social development. I still feel that certain subjects like humanities have not been included even in the present time for fear of over-load. We thought we should proceed gradually in this matter with the utmost co-operation of medical colleges, universities and teachers in the country. It was our experience in 1952, when we revised the curriculum that some of the changes we suggested initially were not acceptable to many and the Council had to alter some of the recommendations to suit the various teaching institutions. We are conscious of the divergent views held by some in India and we do not wish to impose our views on the universities except to offer the views of the Council in the light of our large experience in medical education for their consideration and adoption. This has always been the policy of the Council.

Many salutary changes have been introduced in the revised curriculum, such as :

(1) *Selection of students for admission.*

To do away with the various methods adopted by different medical colleges, the Committee have recommended that the selection be made after a competitive examination giving weightage to academic qualification, interview, aptitude, personality, sports, N.C.C., and physical fitness, etc.

(2) The period of study has been fixed at 5 years for sake of uniformity.

(3) To stress the importance of the preventive aspect of medicine, the subject of Preventive and Social Medicine has been introduced from the very commencement of the course and to be integrated with the later studies.

(4) The elementary study of subjects like Biophysics, Nutrition and Dietetics, Genetics, Psychology, Statistics, etc., has been introduced as an additional feature.

(5) In teaching of undergraduates, stress has been laid to teach basic principles and to avoid details in all subjects.

(6) Stress has been laid for seminars, conferences, symposium and lecture demonstrations, etc., at the expense of didactic lectures.

(7) The number of working days in the year have been increased.

(8) Emphasis has been laid on the importance of day-to-day work and its assessment, and recommendations have been made to carry forward the results of such assessment to the university examination to the extent of 25 per cent both in theory and practical.

The new features in the curriculum are aimed to bring about regularity in attendance and continued application to work, with a special emphasis on the practical aspect of the training. This curriculum is presented as the minimum requirement for acquisition of the requisite knowledge and skill for practising as a general practitioner. The universities and other teaching institutions are at liberty to go beyond the prescribed minimum keeping in mind the total load involved in the course of undergraduate medical study.

Regarding selection of students to the medical colleges, your Committee has suggested a number of alternatives of the basic requirements before entering into medical study. There is absolutely no bar for anyone, provided he satisfies the minimum requirements of the Council. We have even gone to the extent where graduate science students, who have not done one or more of the prescribed subjects for admission to the medical colleges are allowed to undergo these subjects in the pre-medical course, so that even a student who has taken mathematics as one of his subjects for B.Sc., would be in a position to be considered for admission to a medical college.

Regarding the age of admission, which we have kept at 17 years, I must state that even the Government of India has approached this Council for relaxation of this age limit in a certain case. We are facing on the other hand, a situation in which it is said that the students who are admitted in the medical colleges are far too immature for entering into serious study of the difficult medical course. We have tried to be fair and fixed the age at 17 years on the 1st October of the year of admission to 1st M.B.B.S. Course.

I would like to state that one of the objects of the Higher Secondary Education Committee when they introduced Higher Secondary Education was to see that students were diverted into various channels early in life to avoid unnecessary wastage of university facilities. As such the selection of students on passing the Higher Secondary Course or the Pre-Medical Course is only a corollary to the above decision of the Higher Secondary Education Committee.

A criticism has been tabled, that the medical colleges have no contact with the humanities or other philosophies and no association with the university life. This criticism has no foundation in India. Almost all the medical colleges take part in activities sponsored by the universities, both cultural and academic and also in the realm of sports and games. Some of the finest speakers and debators in our country have come out from our medical colleges. In the inter-university cultural competitions and sports, and games, medical students always have contributed their share. From these colleges have come out statesmen and administrators; leaders in India and in the international field.

In a country which is striving to produce the maximum number of doctors possible, it is true, that more attention could not be paid to subjects like humanities but mainly to develop sufficiently qualified and technically competent persons. This has happened all over the world where such a large demand had suddenly arisen. In spite of this, our medical graduates are men of wide outlook, intelligent appreciation and capacity for independent thought. Some of our young men are now playing a vital role in the various research establishments of the country. The Council has always maintained that for better education there should be more teachers and better facilities. For speedy creation of adequate number of teachers with high academic qualifications and research experience, the Council has recommended in 1957 to the Government of India and the State authorities to take steps to ensure that the teachers in the medical colleges are properly paid and are provided with adequate amenities and retained in teaching appointments up to the age of 60 years.

The Council is aware of the increase in medical colleges taking place in the country, as also the fact that more medical colleges will be opened in the near future. This will obviously call for more teachers and amenities to be provided to them. On receipt of a reference from the Central Government in 1959, the Executive Committee of this Council considered the question of increase in medical colleges and training of postgraduates, and was of the opinion that "the question is inevitably bound up with the training of postgraduates which depends naturally on availability of training facilities. The training of teachers should be done in as many institutions as possible and not in one or two institutions only as it will be quite insufficient to meet the needs of the country. Besides, this will not only improve the undergraduate training but it will also provide larger facilities for the development of specialities in the different branches of study. It is the considered view of the Executive Committee that training of teachers and postgraduates should not be concentrated in central places but should be spread all over the country in order to get the maximum benefits. It is obvious that wherever there is postgraduate training arrangements, the training of undergraduate is bound to improve as also the treatment of patients in those areas."

The question of change of medium of instruction in the medical curriculum has been under the active consideration of the Council. The various universities, medical colleges, State governments, etc., have been requested to send in their views in the matter, when all the replies have been received, it will be placed before you for your consideration.

Section 20 of the Indian Medical Council Act of 1956 provides for the formation of a Post-graduate Medical Education Committee. Although this committee has not yet been formed, the Council has been concerned with the standards of postgraduate training and examinations of the various universities. As in the case of undergraduate medical curriculum, the Council prescribed its recommendations on postgraduate medical education in 1952 in consultation with the universities and forwarded the same to them for their guidance and implementation. The Council has carried out inspection of several postgraduate medical qualifications awarded by the universities and recommended to the Central Government for inclusion in the First Schedule to the Indian Medical Council Act, 1956. Most of the qualifications have since been included in the schedule and notifications in respect of some are still awaited.

In February, 1959, the Council celebrated its Silver Jubilee, during which Sectional Seminars on various postgraduate subjects were organised. The reports of the Sectional Seminars concerned were forwarded to the universities and State Governments, etc., for their consideration and opinion. The views received were considered by a Sub-Committee appointed by the Council, which also considered the question of revision of the postgraduate medical education recommendations adopt-

ed by the Council in 1952. The Sub-Committee has accordingly revised the postgraduate medical education recommendations in the light of the changes that have taken place since then and in the light of the views of the various Members expressed during the Sectional Seminars. The revised recommendations were approved by the Executive Committee and have been forwarded to universities for eliciting their opinion.

As regards teaching experience for appointment of teachers in medical colleges, the Council has relaxed the requirements in a number of cases in regard to persons holding postgraduate qualifications and who have been recommended by the States or universities concerned. No hard and fast rules have been enforced. The Executive Committee further in July, 1960, decided "that in case medical persons holding the requisite postgraduate qualifications in the pre-medical subjects are not available, the question of employment of non-medical scientists as teachers in these subjects can be considered after reference to the Council by the authorities concerned." Again in November, 1960, the Council agreed to the recognition of certain postgraduate American medical qualifications for purposes of teaching appointments in medical colleges.

In 1952, the universities were approached for their suggestions regarding exchange of teachers to medical colleges in the universities and in the States and the Executive Committee after considering their views resolved "that as an initial measure exchange of teachers may be provided between colleges in one State or colleges under different universities in a State. The detailed arrangements for such a scheme may be left to the universities and the colleges concerned."

Recently integrated teaching has been introduced in some of the medical colleges in India. In our revised Standard Inspection Forms we have requested the colleges and the inspectors to give details of the working of this scheme, so that we could consider the same in relation to the experience of the few colleges where such training has been introduced.

The Council adopted on 25th/26th August, 1937, the recommendations with regard to concessions to the licentiates for undertaking the condensed M.B.B.S. Course and circulated the same to the authorities concerned. A number of licentiate doctors have taken advantage of this concession which is allowed up to 1961.

Since 1947, the number of licentiates who have got the university degree by taking advantage of condensed course is 2519 and in 1960 the total number of students undergoing the course throughout India was 307. I feel that it is high time that this condensed course be stopped. Those who desired to take advantage of the course have already done so and it is not desirable to keep the course open for a very small number that might trickle down from time to time as it is bound to interfere with the regular undergraduate training programme. We are making every endeavour to increase the output of graduates from all medical colleges to the highest potential to meet the requirements of the five year plans.

In all the above matters, universities and medical colleges have been given full discretion to mould and direct medical education. No sword of Damocles has ever been hung over the heads of universities and medical colleges. It is perfectly true that Council's inspectors point out defects in the organisation and functioning of medical colleges and the facilities which are available for teaching and their standard of examinations. These have ever been made in a constructive spirit and such criticism has always been of immense help to the colleges and universities to reshape their colleges and also to get the necessary requirements sanctioned by the Government.

During the last few years, the Council has had to recommend to the Central Government the recognition of medical qualifications of certain universities from only a specified date as they were satisfied with the facilities available and other requirements only from that date. While this may cause some difficulty to the students who graduated from these institutions prior to the said dates, the Council felt that only by such specification could it improve the standards of examination and the facilities at those institutions. In one case, the Council went almost to the length of recommending the withdrawal of recognition of the qualification awarded by the university, with the result that both the universities and the Government were forced to take all necessary steps to see that the requirements of the Council were fulfilled.

It will thus be seen that the Council has taken a dogmatic stand only when the standard of medical education is sacrificed. On the other hand, the Council's approach has always been flexible so as to suit the changes that are taking place. It is hoped that with the co-operation of the universities and the medical colleges and the Central and State Governments, the task of the Medical Council of India in maintaining the high standard of medical education and in discharging its functions as envisaged in the Indian Medical Council Act, 1956, will be fulfilled.

Opinion regarding post-examination training and its implementation by the various colleges and universities was also considered by the Sub-Committee on Post-Examination Training which gave its recommendations which were considered by the Executive Committee. The Executive Committee was firmly of the opinion that the post-examination training is a vital necessity at present for all medical students in as much as it gave the necessary practical training for the student before he embarked on his career. They have therefore, after careful consideration recommended that this post-examination training should continue, but for a shorter period, of six months only, the other six months having been incorporated into the regular curriculum in the clinical subjects. This post-examination training may be done in any recognised teaching, non-teaching, civil or military hospital, in urban or rural areas and will include courses on family planning. Besides, 1½ months of this training will be at a rural health centre. It is intended by the Executive Committee that if this training is carried out in military hospitals no separate training in a rural health centre

is necessary. Every effort will be made to see that as many district hospitals and well-equipped private hospitals are recognised for purposes of imparting this post-examination training. I feel the scheme of training should be strictly of practical nature and further feel that such a training be undertaken in non-teaching hospitals to avoid the increase in the load of teaching prevailing in teaching hospitals today. I would suggest, that detailed plans for training purposes be worked by a Committee and the same be submitted to you in due course of time for your approval.

In view of the very many changes that have taken place in the training programme and examinations, I felt the urgent need of revising the Standard Inspection Forms and I also felt that such forms should be prepared for inspection for postgraduate training facilities and examinations. Accordingly I appointed a Sub-Committee to make recommendations in the matter. Expert opinion was called for from the members of the various specialists sub-committees in different subjects formed in 1954 and 1958-59. Also I invited a number of professors from the All India Institute of Medical Sciences, Lady Hardinge Medical College and the Maulana Azad Medical College to the meeting of the Sub-Committee to give their valuable suggestions in framing the forms. I am thankful to all these members who have spared their valuable time for helping the Council. I am particularly thankful to Dr. S. K. Menon for not only rendering assistance in preparation of these Forms in the subject of his speciality but also for working very hard for about a month in correcting all these Standard Inspection Forms in all subjects and bringing them to some uniform pattern.

The revised Standard Inspection Forms are framed to elicit exhaustive and accurate information of the actual facilities available at the medical colleges and associated teaching hospitals. It is hoped that the inspectors will be spared from making lengthy reports in future.

The forms have been divided into 3 parts. The first part deals with the general observations on colleges, associated teaching hospitals and courses of study. The second part is concerned with the facilities available for teaching of the particular subject and the third part is regarding the method of conducting examinations and the standard of the same. In this connection, I would like to refer to a recommendation of the undergraduate Curriculum Revision Committee which gives credit to the periodical examination results in the class examinations and also marks assigned for certified work done in classes as assessed by the teachers and certified by the principals.

A Sub-Committee is considering whether there is any necessity of revising the Council Publication on Standard Requirements for a Medical College admitting 100 students annually, intended simply to serve as guidance, and the same task has been entrusted to Dr. R. M. Kasliwal as convener and I hope he will submit his report as early as possible. This standard requirement pamphlet was prepared only for the guidance of new colleges, and there is no intention to force it on them.

You may remember that at the time of the Silver Jubilee Celebrations when the Sectional Seminars were being held, I made a promise to you to convene a Sub-Committee for going through the reports and observations submitted by the various competent authorities and associations. The Sub-Committee had before them the reports of the Sectional Seminars and also the observations on them by the various universities, specialist associations and professors of medical colleges and they formulated recommendations regarding post-graduate nomenclature, period of training, examination, etc., which were adopted by the Executive Committee with minor modifications and the same, have been forwarded to the various medical colleges and universities for their opinion and will be placed before you for your consideration in due course.

Efforts have been made during the last decade to increase the medical man-power in the country in order to cope with the demands in the developing economy as envisaged in the Planning Commissions' objectives. As early as 1949-50 it was suggested to increase the number of admissions by introducing double shift system in the existing colleges and for this purpose we adopted a resolution for introduction of the double shift system and also to increase the admissions by 25-30 per cent in the then existing colleges, if double shift was not acceptable. This resolution was circulated to all the State Governments, universities and medical colleges.

With a view to attain this objective it was also envisaged by this Council that the starting of more medical colleges would be necessary. At the same time it was visualised that increase in the number of teaching personnel required to man the existing as well as the new medical colleges would be necessary and I discussed this matter on a number of occasions with the officials of the Health Ministry even with the Health Minister. With this object in view a Planning Committee was constituted at the Council so as to prepare further suggestions in the light of the views received from the Planning Commission and the Union Health Ministry.

On matters concerning development of medical education in each institution, the universities and the medical colleges also were requested to constitute similar planning committees at their own ends to assist the planning and development of new institutions and teaching organisations for the purpose. Universities, were also requested to constitute post-graduate boards or specialists boards in order to prepare training programme for each of the specialities and to institute degree or diploma courses for each of the specialities of medicine, so as to bring up adequate medical personnel for specialists services in the country as well as to meet the needs of teaching institutions.

Basis for planning for the health programme in the Third Five Year Plan was worked out by the Working Committee of the Health Ministry and they asked my opinion as regards my views on needs of teaching personnel, etc. arising in the Third Five Year Plan. I then suggested that at least starting of 25 new medical colleges would be essential. When the then Secretary, Health Ministry, asked me whether the existing medical colleges can admit 150 students instead of 100,

I readily agreed, and I immediately brought this matter to the notice of the Executive Committee, which likewise recommended for increase in the number of admission into medical colleges and as a result a number of medical colleges are now admitting 150 students instead of 100. In spite of these efforts the problem of shortage of medical men does not appear to indicate any solution.

I attended the meeting of the Central Health Council at Jaipur and I heard the inaugural address of Shri D. P. Karmarkar, the Union Health Minister. During his speech, he made some *ex tempore* remarks in which he advocated the starting of new medical colleges in large numbers to meet the shortage of medical men and appealed to the audience particularly the Health Ministers and the officials of Medical Departments even to allow the starting of private medical colleges to raise the output of medical personnel in the country. He further emphasised that the new medical colleges were assured of the support of the Government of India and that they need not worry about this or that stipulation of the Medical Council of India, and not to take seriously the stipulations in matters of teaching experience laid down for persons to hold teaching appointments in medical institutions. He advocated that post-graduate qualifications are more than enough and the colleges could appoint persons holding post-graduate qualifications only, to fill up the vacant posts in case teaching personnel with requisite experience were not available. I then had a conversation with the Health Minister and informed him that the Council had been following the same procedure and had relaxed these conditions when any such difficulty arose and the case referred to us either by the universities or by the States.

I was however, impressed about the necessity of increasing the number of medical personnel in the country as I listened to the discussion that took place at the Central Health Council. Various states opined, that they were experiencing a lot of difficulties in filling the posts at district and rural level with the result that a large number of vacancies remained unfilled due to non-availability of medical men with requisite qualifications even when the posts are advertised. I do feel that there is genuine immediate necessity to effect a large increase in the number of medical men. With this object in view, I placed my viewpoint at the Sub-Committee level before drafting the revised curriculum for undergraduate and postgraduate, and the Sub-Committee passed a resolution to the effect that each medical college may increase admissions by 50 per cent but not exceeding 200, from the next academic year for a transitional period of 10 years till the emergency is tided over, provided facilities are also increased.

I urge upon all the authorities concerned to admit more students in each of the medical colleges as it will be appreciated that it is very difficult to start new medical colleges in large numbers to cope with the demands as we are placed to-day in a very critical position due to shortage of teachers to man them and as it involves a very huge expenditure on the exchequer of the States. I would here like to quote Dr. Papo and Dr. Arundi of Yugoslavia who came to India on the invitation of the Government of India to relate their experience and show their technique and skill in surgery and its special branches and they told me that in Yugoslavia they have only 5 medical colleges and they were admitting 100 students in each of the medical colleges. They felt the necessity of more medical colleges or to create more medical men by admitting more students in the existing colleges and therefore the authorities issued an order to admit 1,000 students in each of the colleges for 10 years, and thus they admitted 5,000 students in all in the 5 medical colleges every year. Yugoslavia satisfied all the requirements in matters of health services and increase in the required number of medical personnel, and after meeting their needs to maintain their services, they reverted to the normal programme of medical education. They did not introduce any short courses or licentiate courses or health assistants' courses. I would commend strongly that such steps should be taken immediately to meet our needs. I am sure, this will not in any way lower our standards to any undesirable level if the scheme is properly planned, prepared and executed with caution, care and vigilance and withdrawn after the lapse of 10 years. We cannot think of starting an unlimited number of medical colleges indiscriminately in order to meet our present needs in this matter.

Therefore, I believe that all the medical institutions controlled by the Central and State Governments should take steps to fulfil their important responsibility to the nation by carefully planning for admitting 200 students in a medical college and training them effectively without lowering the prevailing standards. It is possible that all the institutions will not be able to maintain strict student-bed ratio of 1 :5 nor is it possible to engage all the teachers with teaching experience as stipulated by the Council. While appointing the heads of the departments of a medical college, it is necessary that a person with requisite post-graduate qualification and teaching experience be selected but for the rest of the posts, persons with post-graduate qualification with some experience in teaching may be chosen, but under no circumstances it is desirable to keep the teaching posts vacant in view of non-availability of teachers with requisite qualifications and experience. Besides it is felt that superannuation age may have to be increased to 60 years or more in some cases due to dearth of teaching personnel. I confidently assure you that all the necessary steps have been taken by the Council to increase the medical man power to a degree which will be quite sufficient in the present stage of our developing economy in the immediate coming years. The Council has neither been rigid in its curriculum nor in its enforcement of its stipulations as regards staff, accommodation etc. but it is true the Council is very keen and has been vigilant to see that the standards are maintained.

The Sub-Committee also felt that in order to produce more postgraduate for manning the teaching hospitals and medical colleges and also for the various specialist

departments in other hospitals, it was very necessary that Government should employ all the graduates who passed from the medical colleges and divert such of those who showed talent for postgradnate work for specialist training and teaching work. The Executive Committee considered these resolutions and in the light of the President's Report on the Central Health Council Conferences discussed the possibility of a little flexibility in the requirements on facilities and accepted the resolutions. These have been circulated to the universities, medical colleges and State Governments for their opinion. The steps suggested if implemented by all concerned will enable the institutions to turn out more medical men without lowering the standards to any extent and enable the institutions to take more postgraduate students and help the country in the maintenance of specialist medical service.

It will thus been seen that the Council is always striving to increase the medical man-power necessary in this country to meet the requirements of the various plans. But at the same time the Council is aware that doctors who have not received thorough training should not be let loose among the public. The Council is fully aware of the great difficulties which medical colleges and the universities have experienced initially, to implement all the recommendations of the Council, but the Council has taken a lenient view in initial stages. However, it should be the earnest endeavour of all those who are interested in medical education in India to see that reasonable facilities are provided and adequate standards are maintained in regard to medical education. When we have once accepted this principle, there is no room for thinking again in terms of shorter courses or licentiate courses or do away with the standards so far enforced and particularly it would be unwise to think of such courses, as they seem to be bent on in Mysore and other States.

At the last meeting of the Council I had informed you that there was a move in some States to start licentiate course again. I had stated that this was a retrograde step and would not solve the problem of finding medical personnel for the rural areas.

It is therefore, surprising that the Government of Mysore are again thinking of starting licentiate courses, stating that it was an emergency measure and that they would later on provide condensed courses for these licentiates to qualify as graduates. When I met the Health Minister of Mysore at the meeting of the Central Health Council, I had discussed this matter with him and tried to explain the drawbacks of this proposal. It would not be possible for anyone to force the licentiates to go to the villages. The Constitution of the country forbids any sort of discrimination and to think that rural people only required a lower class of doctors is absolutely wrong. Rural people are generally of simple nature and they should not be made to feel that they are differently treated from urban population. They form the majority of the population in the country and are entitled to the best type of medical treatment. The argument that only simple diseases need be treated by these licentiates in rural areas and anything difficult could be sent to hospitals in towns is not proper. One never knows when an emergency would arise and especially in view of the serious transport difficulties in rural areas, it may not be possible to transfer the patient in time to the city hospital. It is therefore, necessary that fully trained doctors should be posted in rural areas.

The Health Minister of Mysore himself has realised that these licentiate doctors would not be fully trained for proper work and has in the same breath suggested, giving them a Condensed Course later. I may state that this Council does not intend to go on allowing such courses to continue. Over the last so many years when this Course was available in a number of medical colleges, only a few hundred have been benefited by it, although there are nearly 30 to 35 thousand licentiates in India. The Condensed Course upsets the normal working of medical colleges, causing unnecessary overloading on the staff and preventing them giving their full attention to the regular M.B.B.S. students. Besides, although the Council has stipulated that necessary additional facilities should be provided for the Condensed Course students, this is seldom done. The Council does not think that any useful purpose will be served by continuing this Course. Bearing all this in mind I think it would be correct to appraise the Mysore Government of the true situation and the Council should send a small Committee to meet the Chief Minister of Mysore and the Health Minister, to impress upon them the necessity of abandoning the idea especially when we have now recommended increase in admission in the existing medical colleges to tide over the national emergency.

Recently there has been a clamour for giving some sort of condensed courses to students who have qualified in indigenous medicine. I would like to draw the attention of this Council to the consequences which would occur if any such scheme were accepted. There is great danger that our medical qualifications may face a great deal of difficulty for recognition by the other countries in the world.

I would also like to bring to your notice the letter received on 14th December, 1960, from the Registrar, General Medical Council of United Kingdom to this Council in which it is stated that the General Medical Council "were disturbed to receive information that a College of Integrated Medicine had been established in Madras, in which instruction was given concurrently in indigenous and modern medicine; and that legislation had been introduced in Madras which provided that 'Any person who possesses the diploma of Licentiate in Indigenous medicine, or the diploma of Graduate of the College of Indigenous Medicine shall be deemed to possess the diploma of Licentiate in Integrated Medicine or as the case may be, the Diploma of Graduate of the College of Integrated Medicine" and further, enquiring "how far persons holding qualifications granted by such institutions have received Government recognition; and to what extent practitioners who hold qualifications recognised by the General Medical Council are called upon to hold appointments in hospitals and other institutions where other members of the medical staff hold qualifications in Indigenous Medicine." This letter has been

circulated at the instance of the Executive Committee to all the State Governments, universities and medical colleges, to find out whether there was any basis for such statements.

On a representation by the students of the Robertson Medical School and the Government of Bombay regarding upgrading of Medical and Health Assistants' Course at R. M. School, Nagpur to the L.M.P. Standard (M. P. Government) and inclusion in Part I of the Third Schedule to the Indian Medical Council Act, 1956, the Council had decided that these students holding the D.M.P. qualifications, should be allowed to undergo a condensed course leading up to an examination of a standard equal to the L.M.P. standard and had authorised the Executive Committee to draw up the necessary syllabus and at the same time asked the Government of Bombay to stop further admission to this course. The Government of Bombay agreed to this and no further admissions have taken place. The Executive Committee appointed a Sub-Committee consisting of teachers in the various subjects and a draft syllabus was prepared and approved by the Executive Committee. This has been forwarded to the Government of Maharashtra to enable them to make the necessary arrangements for the condensed course.

With a view to further medical relief in the country, the Council has been registering foreign nationals holding non-scheduled medical qualifications for purposes of medical practice which would be limited to the institutions to which they are attached for the time being for purpose of teaching, research or charitable work. Since the passing of the Indian Medical Council Act of 1956, 32 doctors have been registered under the above condition (Section 14 of the Indian Medical Council Act, 1956).

During the last year 5 foreign medical qualifications held by the Indian Nationals were recommended by this Council and included in the Schedules. I would like to state here that only qualifications of eminence from recognised universities and institutions would be recommended for inclusion in these Schedules. As such I would like to warn Indian students contemplating to take basic medical degrees from abroad that they should only seek admission to such universities or institutions whose qualifications are likely to be recognised by this Council. Especially, I would like to warn them against taking any licentiate qualifications which is of standard, below our basic medical degree, because such licentiate qualifications are liable to be refused recognition by this Council in as much as this Council has already decided on complete abolition of all licentiate courses in medicine in India.

In this connection, I would like to inform you that for the last few years the Council had been giving earnest consideration to the recognition of the licentiate qualifications (L.M.F.) awarded by the State Medical Faculty of East Pakistan. It would seem very absurd to recognise a foreign licentiate qualification whose standard we have no adequate means of knowing, when we have abolished all licentiate courses in India. I am constrained to state that this L.M.F. (East Pakistan) seems to me to be an attempt at a back-door entry into the medical profession in India. Your Executive Committee has carefully considered the question and their recommendations will be placed before you in due course.

At the last meeting of the Council, we had accepted the nature of the practical training to be undergone by Indian Nationals holding foreign non-schedule medical qualifications and the certificate that has to be produced in this connection. This had been circulated to all the authorities concerned and all future registrations under Section 13 of the Indian Medical Council Act will be guided by the above requirements.

While the Government of India has accepted the practical training prescribed by this Council, they have raised a point that the Medical Council of India should not insist on a certificate from the Head of the Medical Department of the State, as it felt that it would not be convenient for the candidate to have such training certified by the Head of the Medical Department of the State. I would like to state that the certificate required by the Council has to be signed by the Medical Officer in charge of the institution where the candidate had his practical training and has to be countersigned by the Head of the Medical Department of the State, as this Council may not be aware of all the hospitals in a State where the candidate may have obtained practical training after obtaining the qualification. It is only the Head of the Medical Department of the State, who can ensure whether the hospital in which practical training was undergone could offer reasonable facilities for training under guidance as required by the Medical Council of India.

An instance has occurred when a State Medical Council has registered a person holding a qualification included in Part II of the Third Schedule of the Indian Medical Council Act, 1956, on its own without consulting the Council, especially as the candidate concerned has not fulfilled the requirements of the practical training as prescribed by the Council. This is in contravention to the provisions of Section 13 of the Act which stipulates that no candidate possessing any such qualification shall be entitled to enrolment on any State Medical Register unless he has undergone such practical training as may be prescribed. I am firmly of the opinion that all cases of registration under Section 13 and 14 should be decided only by the Central Government in consultation with this Council.

At your request the Executive Committee reconsidered the matter of inclusion of the qualification M.M.F. (Bengal) in the First Schedule of the Indian Medical Council Act, 1956. In view of the fact that the Central Government had not specified any date regarding the recognition of M.M.F. (West Bengal), the Executive Committee was of the opinion that it was the intention of Government that both the qualifications should be recognised as M.M.F. (West Bengal) was only a continuation of M.M.F. (Bengal). As such the Executive Committee has recommended for your consideration the inclusion of M.M.F. (Bengal) when granted prior to August, 1947, also in the First Schedule to the Indian Medical Council Act, 1956.

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You all are aware that at the last meeting of the Council we had accepted certain amendments to the Indian Medical Council Act, 1956, and these have been forwarded to the Central Government for acceptance and necessary modification of the Act. Recently, we were approached by the Health Survey and Planning Committee regarding the question of amending the Indian Medical Council Act, 1956. Your Executive Committee considered the matter and decided to forward a copy of the amendments already accepted by the Council to the Health Survey and Planning Committee. I may inform you that from the discussions I had with the authorities concerned, these amendments may take a long time to come into being. Until the matter is clarified we will experience some difficulties in our inspections and other work. It is earnestly hoped that the Government will accept our amendments at an early date.

Though the Council had repeatedly resolved that the Indian Medical Register should be compiled Statewise, Schedulewise and in alphabetical order and informed the Central Government accordingly, the Government in their letters insisted on a single common Register of all medical practitioners arranged in alphabetical order. Their latest letter dated 26th November, 1960, to this effect is being placed before you for your consideration.

I may also point out that the office has already compiled a large portion of the Register according to our previous decision of Schedulewise, Statewise and in alphabetical order. Now to recompile the Register according to the wishes of the Government will be a colossal waste of time and labour. The office has estimated that if the Register were to be compiled on the lines indicated by the Government of India within a year then additional staff would have to be straightaway employed. It has been pointed out that first of all, all the non-scheduled qualifications have to be deleted from the various printed Registers submitted by the different State Medical Councils. After this the name and full particulars of each of the doctors have to be typed on cards. The typed cards are further to be arranged in alphabetical order taking up all the names from all the State Medical Registers. This would have to be carefully checked both for any missing names, correctness of entry and also the arrangements of the alphabetical order. Subsequently, a consolidated list would have to be prepared and typed for publication. It is presumed that the Government of India will undertake the publication of the Register as according to the Section 21 (2) of the Act, the Register has to be published in the Gazette of India to deem it to be a public document within the meaning of the Indian Evidence Act, 1872. Your Executive Committee considered this matter carefuly and authorised the Secretary to approach the Government of India for sanction of the additional staff and equipment. The Ministry of Health has sanctioned the additional staff (after curtailing few posts) and also the equipment required. It is now hoped that with the appointment of the necessary extra staff the work of compiling the Register would be completed in as short time as possible and the new All India Medical Register would be published soon, but in view of the enormous labour involved in the process, I do not feel that the Register would be ready at least for a couple of years, or more.

You may remember that at the last meeting of the Council we had accepted the following resolution of the Executive Committee at its meeting held on 4th November, 1960 :—

> "The Executive Committee repeats its request to the Government of India to follow the same procedure that was adopted in the year 1955 and to first select the six members to be nominated by the Government, because the number of nominated members being twice that of the members to be elected by the Council, it is but proper that the selection of nominated members should be made first. Further since the item of election of three members by the Council could not be placed in the Agenda it cannot be considered at the meeting of 5th November, 1960, and shall be considered at the next meeting."

In spite of our requesting the Government repeatedly to first nominate the Members of the Postgraduate Medical Education Committee, the Central Government have again asked this Council to first elect three members and to communicate their names to the Ministry. They have further stated that the Government of India will nominate six members on the said Committee after election of three members. The Executive Committee decided to place it before you for your consideration, and I put it to you that you accept the suggestion of the Government and this item of election will be taken up at this meeting and it is already on the Agenda.

Information was received that there was a move in the Ministry of Health to shift the office of the Medical Council of India out of Delhi. Under my instructions the Secretary made a representation to the Government of India on this matter, pointing out the provisions in the Regulations of the Medical Council, which stated "that the office of the Council shall be situated in Delhi" and as such the appointments have been made on the above understanding. It will therefore be very difficult for this office to force its employees to go out of Delhi. It was also pointed out that the present building was constructed exclusively for the use of the Medical Council and other Councils, and Government asked us to shift to the new premises, built specially for the Council.

It was also mentioned that the office of the Medical Council has been in Delhi since its very inception, i.e., 1934 and since 1937, the Council Office was installed in a rented accommodation in Regal Building on a nominal rental of Rs. 252-8-0 per month; for our present building we are paying almost 3 times that amount. The advantages of keeping the office in Delhi was also stressed. A copy of the representation was forwarded to all the the Members of the Council. As a result of the representation, in their letter dated 8th December, 1960, the Government of India stated that the proposal to shift the office of the Medical Council of India and the Dental Council of India out of Delhi

has been kept in abeyance for the time being. I am still at a loss to know what was the purpose in attempting to shift the office of the Medical Council out of Delhi. I hope that the proposal to move the office out of Delhi will be given up by the Government and I am sure all the Members of this Council will do their best to see that such proposals do not materialise and if the issue comes up again we shall not vacate the premises and will represent the case and I hope the Council will agree with the steps so far taken and will be taken in future.

I want to draw your kind attention to an article written by Lt. Col. V. Srinivasan, Director-General of Health Services, in the Souvenir published by the Ministry of Health in connection with the W.H.O. Assembly. I read it with painful surprise and I am sure that those who had an opportunity to read it will share my feelings when I say that the article is improper, especially coming as it does from a nominated member of the Indian Medical Council and it has been published in the W.H.O. Souvenir. I understand that the Souvenir was distributed to the Representatives of 108 countries, who had attended the Session and many others who participated in the Assembly and many more must have been sent all over the world. It is strange that a person who holds the post of Director-General of Health Services should ridicule or belittle the working of the Indian Medical Council in the Souvenir and it will not be surprising that some of the Delegates to the W.H.O. Assembly must have returned to their respective countries carrying a false impression of the working of the Indian Medical Council as sought to be made out by our overenthusiastic D.G.H.S. whose criticism of the Indian Medical Council is irresponsible and lacks veracity. I fail to understand, why Lt. Col. Srinivasan has conveniently sought the medium of an official publication for expressing antipathy to the Indian Medical Council of which he is a nominated member.

Col. Srinivasan has taken great pains to recount all the difficulties that confronted the development and progress of Medical Education in India from the time of the East India Company but has studiously avoided mentioning the strenuous efforts made by all his predecessors, the Central and State Governments, universities, medical colleges and such statutory bodies as the Medical Council of India in the field of medical education in India. He has unnecessarily painted a very dark picture of the evolution of medical education in India up to the present time which extends over 9 pages of the article and in the last page about "Future" he has made a prophesy of a very bright future. To put it in his own words, "considerable thought is being devoted to all the matters raised above and there is no doubt that the much needed reforms will take place before long." Despite the phenomenal progress that India has made subsequent to attainment of Independence in all spheres of human activity it would seem strange that things were allowed to stagnate or deteriorate in the field of Medical Education and wisdom has now dawned rather suddenly for reasons difficult to surmise, other than the fact that he has recently occupied the chair of the high responsible office of Director-General of Health Services to the Government of India. The Herculean task of weaning Medical Education from the control of General Medical Council of Great Britain and the establishment of a representative and Statutory Body as the Medical Council of India to take over its duties, nearly 15 years before India got Independence, does not seem to have any significance in Col. Srinivasan's estimation. He has referred to the Medical Council of India as the body that inherited the legacy of exercising "absolute control over the standards of education" interdicting "any attempt at originality or experimentation" in any training centre. He has wisely concluded that "the price of uniformity has been mediocrity". I have no hesitation that this is almost distortion of facts. No one will deny that it is essential to have a minimum standard for an examination which qualifies a person to practise medicine. The Medical Council of India has never denied scope for originality or experimentation provided a desirable minimum standard has been maintained. Gentlemen, I need not explain to you the attitude of the Council towards institutions engaged in medical education. We have always been advisory in our function. We advise and help the institutions in all possible ways to improve the standard and we are advisory even in our relationship to the Government of India. Yet the Director-General, complains to an International Assembly, of our tyranny and hopes to "liberate the medical colleges from the present all powerful Indian Medical Council". I am at a loss to understand the motive of the Director-General in misrepresenting facts in such a manner to the outside world. Has any useful purpose been served by his article under reference except that he has created the impression that he has emerged on a tragic scene, as a saviour to redeem suffering humanity from dark ignorance and the tyrannical yoke of the Medical Council of India. The importance of research has been so emphasised in recent years by the Council that it has almost become a compulsory part of all post-graduate training programmes and a research atmosphere and attitude of mind has been created in all undergraduate training centres. Yet the Director-General states that "Medical Research, which has been neglected in our colleges should come in more and more and should form an integral part of every college and every course." Gentlemen, you will remember that on the occasion of the Silver Jubilee of the Council, a Seminar of Post-graduate Medical Education was held. A large number of teachers from all parts of the country participated in its deliberations and their recommendations were consolidated and forwarded to all the universities and medical colleges for comments. Does the Director-General, plead ignorance for all these as an excuse to make the following statement in his Article :

> "Postgraduate Education and Specialists Training should be organised. . . . . There should be free discussion on every aspect and facet of Medical Education and those who are most concerned with the subject viz., teachers should be encouraged to

take a leading part in the reforms and to contribute their thoughts and ideas."

The participants in the Seminar on Post-graduate Medical Education were all teachers and all Specialities were discussed separately and their recommendations circulated for comments. What does the Director-General of Health Services gain by denying all these activities of the Council is beyond my comprehension. I am sure, he has gained nothing but the profession and the country as a whole have lost much. It may be that we have lost prestige in the International Medical World. Col. Srinivasan is a member of this Council and if he had any comments to make about the activities of the Council he should have expressed them in meetings of the Council rather than condemn all the progress that this country has made in medical education during the last two decades, to an international gathering. I am at a loss to understand whether the views expressed and the solutions recommended by Col. Srinivasan are his personal views or is he acting as the mouthpiece of the Government of India. It appears abundantly clear to my mind that the solutions suggested by Col. Srinivasan are designed ultimately to do away with the Medical Council of India, which should be a matter for some concern to all of you and to the country as a whole. He wants (1) the establishment of separate organisation in every State for the organisation and development of medical education which will be in close touch with the developments in every country of the world; (2) liberation of medical colleges from the present all powerful Indian Medical Council; (3) to look forward to the wise deliberations and counsel of the newly formed Association for the advancement of medical education in the matter of shaping postgraduate medical education. Gentlemen, I request you to read the article carefully and if my conclusions are wrong I shall feel very happy. I would also request Col. Srinivasan to enlighten the country on the implications of the concluding paras under the heading "Future". After all in this Council are the accredited representatives of the medical profession, of the Medical Faculties of the universities. It seems to me very clear that it is only such a body which can raise the standard of Medical Education in India. If there be defects and deficiencies in its working, we should jointly try to remove them. Even if we abolish the Medical Council of India by another body of medical men, the composition of such a body and its capacity to deliver the goods may be questioned.

NOTES AND NEWS

Gonorrhoea—A Growing Problem

The early promise of the immediate postwar period that penicillin was the ideal drug to control gonorrhoea has not been fulfilled. After fifteen years this venereal infection is still widespread, uncontrolled and one of the challenging health problems of the world.

The latest issue of the *Bulletin of the World Health Organisation* (Vol. 24, No. 3, 1961) reveals that gonorrhoea not only has held its own, but in some countries has even increased. This failure should be recognised and calls for alertness by health administrations, the Bulletin states.

The disease is occurring more often than formerly in the 15-19 age group and has become a part of the "teenager" problem in Sweden, the United Kingdom and the United States, according to the Bulletin.

Gonorrhoea remains a dangerous disease of women. In spite of the general belief that penicillin treatment has greatly reduced complications, they still occur in ten per cent of cases and two to three per cent of women become sterile. Moreover there are large reservoirs of undiagnosed infection in women, difficult to deal with because symptoms often are lacking.

The problem is still more difficult since it is now necessary to use from four to six times as much penicillin to cure gonorrhoea as ten years ago. The possibility that the gonococcus is developing resistance is very real, the Bulletin states, and careful studies are needed to elucidate this matter. As yet there is no internationally agreed methodology for determining the penicillin sensitivity of the gonococcus and the different methods in use have only recently begun to be studied, under the auspices of WHO.

The Bulletin points out that in spite of the increases in gonorrhoea in 15 out of 22 countries studied by WHO, it is certain that the disease is even more common than official statistics indicate. A recent survey in Britain suggested that the true incidence might be at least 15 per cent higher if all cases were reported. In the United States, special surveys have shown that there are probably five to ten times as many cases as are reported officially in that country. Even so, statistics place gonorrhoea third and syphilis the fourth most frequent infection among communicable diseases reported in 1959. Only measles, scarlet fever and streptococcal sore throat were higher.

Recent laboratory research has resulted in the identification of biochemical fractions of the gonococcus which have made it possible to develop improved diagnostic procedures (fluorescent antibody techniques). This research may open the way to the production of an immunising agent. Unless this happens, some investigators think that effective control of gonorrhoea cannot be achieved, especially in some of the large ports of the world where extensive reservoirs of the gonococcus remain.

Joint FAO/WHO Expert Committee on Danger of Food Additives

A number of natural and synthetic compounds used to preserve foods can be dangerous in the long run when taken in large quantities. They include such ordinary substances as citric and ascorbic acids, that have the added properties of improving flavour and food value of fruit juices.

The task of determining the amount of certain of these compounds that can be consumed daily without harmful effects has just been completed by a Joint FAO/WHO Expert Committee on Food Additives, a highly technical study undertaken for the first time on an international basis.

Throughout the eight days of the discussions, it was constantly stated that each country ultimately would have to find its own solution to the problem of any particular food additive because conditions of life, food habits and dietary patterns vary so greatly.

But about baby foods the Committee believed that they should be prepared without food additives at all, if possible. The mature person is usually equipped with detoxicating mechanisms that are not yet fully developed in a baby, with the result that the risk of poisoning through the indiscriminate use of food preservatives is much greater. The Committee also noted the serious lack of trained pathologists and toxicologists capable of carrying out the necessary investigations to ensure progress in this field, and recommended that FAO and WHO encourage the establishment of more adequate training facilities.

It also felt that work should continue in evaluating the risks involved in the use of emulsifiers, stabilisers and similar substances added to many foods, and should be extended to include antibiotics, food colours, etc.

Director General of FAO Reports on Food

The Director General of F.A.O., Mr. B. R. Sen has introduced a report setting out a "new strategy" for the use of food for economic development before the 25-nation Food and Agriculture Council.

The Council, recently held a ten-day session at Rome.

The report, which is to be considered by the U. N. Economic and Social Council shortly, urges that surpluses of agricultural countries, an amount estimated at some 12,50,000,000 dollars worth over the next five years, be used to promote the economic and social development of the less-advanced countries.

Mr. Sen cited the growing gap in national income between the advanced and less advanced countries and said :

"There can be no question that the ultimate solution of this problem lies in the hands of the countries themselves. But if they are to make any real progress, they must be helped by the developed countries which have resources over and above their own essential needs."

Mr. Sen said that aid "should not be conceived as a perpetual charity but as a means for countries to mobilise the resources which they have in order to break the vicious circles of hunger, poverty and low productivity."

The report noted the "generous proposal" made by the United States of America, which envisages establishment of a multilateral food-use programme aiming at a fund of 100 milion dollars in commodities and cash for initial operations and for gaining experience.

Two Drugs Project Reports Received from Russia

Detailed reports in respect of two of the four drugs projects to be set up in the public sector with the help of the Soviet Union have been received from Moscow. The reports relate to the antibiotics plant to be set up at Rishikesh in Uttar Pradesh and the phytochemical plant for the manufacture of drugs from medical herbs to be erected at Neriyamangalam in Kerala. The other two project reports relating to the synthetic drugs factory at Sanatnagar near Hyderabad and the surgical instruments factory in Madras are awaited.

The reports already received will be examined by a technical committee. Soviet specialists will also take part in the examination and changes mutually agreed upon will be made in the reports.

Food Output in India

Prof. Arturi Virtanen, Finland's only Nobel Prize winner and head of Filand's Biochemical Research Institute said that with a little more effort in improving agricultural production, India can easily sustain a population of one billion.

A distinguished biochemist who won the Nobel Prize in 1945 for inventing a system of preserving fresh fodder, Prof. Virtanen said that he was not one of those who were scared about an impending catastrophe as a result of a world population increase. The world can sustain 20 billion people if adequate use is made not only of the available land and all natural resources but also of fertilisers. India, he said, presented enormous possibilities of agricultural growth and he was confident that these would be availed of.

Prof. Virtanen said that India should experiment with the largescale use of chlorella, an algae that could easily be grown in the backyards. Chlorella is considered to be rich in protein and six times cheaper than milk.

He referred, in this connection, to the excellent work done by a Japanese scientist, Dr. Hiroshi Tamiya, and said that the Tamiya method deserved a careful study by Indian agriculturists.

Chlorella is grown in shallow pools, with a minimum quantity of fertilisers, and dried into powder. It can be used with rice or wheat.

Raptakos Medical Research Board

The Raptakos Medical Research Board will consider applications for the award of Fellowships for research work on medical and allied subjects in recognised institutions situated in the Union of India. The awards normally consist of Rs. 3,000/- per year for a Fellowship and Rs. 750/- per year towards contingencies approved by the Board.

Applications in the prescribed form, and further details may be obtained from the Secretary and Treasurer, Raptakos Medical Research Board, Dr. Annie Besant Road, Worli, Bombay 18, before September 30, 1961.

Medical Research Work to be Intensified

The Indian Council of Medical Research has planned for an intensification of its research activities during the Third Plan period at an estimated cost of Rs. 4 crores, Mr. C. G. Pandit, Secretary of the Council, disclosed at Madras.

Mr. Pandit said that over and above the several research projects already in operation, a chain of full-fledged clinical research units will be established in the various medical colleges in order to carry out further researches in various fields. Particular attention will be paid to problems connected with dental diseases, mental diseases, maternity and child health. A "morbidity survey" will also be undertaken in certain areas of the country with a view to collect data useful to the preventive and curative machinery.

In the field of indigenous medicine too, the Council will be going ahead with intensified programmes. Exhaustive investigations are being carried out by an expert committee which has been constituted for the purpose. During the Third Plan period, indigenous drugs will begin to be used in some of the hospitals.

The study of industrial health problems is another important work that has been taken up by the Research Council. Attention is being paid to the study of environmental sanitation in factories with a view to evolve suitable methods to ensure better health for industrial workers.

Indian Society of Haematology

The second annual conference of the society was held in Madras from 13th to 16th January, 1961 under the chairmanship of Dr. C. R. Das Gupta, the President of the society. The conference was held jointly with the Association of Physicians, Cardiological Society of India, Neurological Society of India, the Indian Association of Chest Diseases, and the Indian Society of Gastroenterology. The joint conference was inaugurated by Shri Bishnu Ram Medhi, Governor of Madras, and was attended by eminent physicians, cardiologists, neurologists, haematologists and other specialists from al over India. A symposium on haemorrhagic disorders was held jointly with the Association of Physicians of India and interesting original haematological papers numbering over 25 and embracing aspects of haematology were presented in the conference.

The following office-bearers were elected: *President*—Dr. J. G. Parekh (Bombay). *Vice-President*—Dr. J. B. Chatterjea (Calcutta). *Secretary*—Dr. Soonu B. Vyas (Jaipur). *Counsellors*—Dr. S. J. Baker (Nellore), Dr. Sujata Choudhuri (New Delhi), Dr. Sharad Kumar (New Delhi), Dr. M. S. Narayanan (Tiruchirapalli), Dr. M. K. Sandozi (Hyderabad) and Dr. C. R. Das Gupta (Calcutta —*ex-officio*).

Production and Utilisation of Medicinal and Aromatic Plants in India

A symposium on Production and Utilisation of Medicinal Plants in India, will be held at the Regional Research Laboratory, Jammu and Kashmir on November 27-28, 1961. The symposium will cover the following branches: (1) Statistics regarding the present availability, consumption, import and export of medicinal and aromatic plants in India, (2) Distribution, collection and cultivation of medicinal and aromatic plants, (3) Improvement of medicinal and aromatic plants by selection, hybridisation and induced mutations, (4) Pests and diseases of medicinal and aromatic plants and their control, (5) Chemistry, biochemistry and commercial utilisation of medicinal and aromatic plants, (6) Pharmacological and microbiological studies on various extractives or pure active principles of medicinal and aromatic plants, (7) Insecticidal, insect-repellant, piscicidal and fungicidal properties of medicinal and aromatic plants.

Medicinal Plants of Forests

Bihar forest administration now seeks to fully utilise the forest produce, more particularly herbs, plants and roots of immense medicinal significance. Bihar is famed for its luxurious reserved forests which cover almost one-fifth of the States total area and had been augmenting the country's requirements for the preparation of Ayurvedic drugs.

Sri M. K. Jaipuriar, the State's forest economist, who is currently attached to the Forest Research Institute at Dehradun, after his 6 months' training will take up the integrated scheme.

Mass X-ray to Fight T.B. Menace

A miniature unit for mass radiography, the first effective step to implement a major plan as a part of an all-out effort to eradicate tuberculosis from the State, was inaugurated on 20-6-61 at the Writers Building by Dr. B. C. Roy, the Chief Minister of West Bengal.

Dr. Roy took the first miniature radiograph with the help of one of the x-ray units which were given by the Soviet Premier as a gift to the Government of West Bengal, in the presence of the officials of the Health Department.

With the help of these new devices, two of which are ready at present for full utilisation and two others yet to be assembled, about 500 school children per day could be screened and checked.

According to the present programme, Government of West Bengal contemplates to screen about 3·5 lakhs school children in Calcutta and suburbs within six months after which the x-ray units will be sent to the villages of West Bengal.

Dr. Roy suggested that this programme should be co-ordinated with the BCG programme so that the detection could be effective at an early stage. With the help of the four mobile x-ray units for 'mass miniature radiography' the West Bengal Government will also cover the school children reading in the secondary stage up to age limit of about 17.

With the help of the mass miniature radiography units a thorough survey of tuberculosis cases in the State will also be possible. With the units' small photographs (35 millimeter) of the chests of the school children and later, of the people preliminary screening will be done. If any shadow of doubt appears, the particular case will be taken up for special study.

Use of Radio-active Substances in Calcutta

Radio-active substances are being used for the first time in Calcutta in the treatment of certain diseases. A special department of micrology has been opened in the School of Tropical Medicine, Calcutta, for this type of investigation. The institute is, it is learnt, making an attempt to isolate influenza virus.

Public Health Engineering

The Planning Commission's Committee or Panel which is headed by Mr. V. K. Modak and includes four other experts, made a study of the problem of public health engineering in its administrative financial and technical aspects and has submitted its report.

The main recommendation of the Committee, it is understood, is that urban water supply and sanitation schemes should be taken up on a self-paying basis. This would in the Committee's view, enable local bodies to make better progress with the implementation of these schemes in future and money could be tapped from a wider field to supplement the resources available from the Five Year Plans. The Committee has pointed out that safe water supply costs the community for its production and management and therefore, it is a commodity like electricity which should be paid for.

The Modak Committee has also advocated the setting up of regional water and sewerage board and the establishment of independent public health engineering organisations in each State staffed with qualified and competent personnel. It has also stressed the importance of starting training programmes for in-service personnel. The Committee wants research to be encouraged in public health engineering, stepping up of the production of materials like cast iron pipes, and valves required for the execution of water supply and sanitation projects at a more rapid pace.

The Committee has also incidentally drawn attention to several of the defects and deficiencies in the existing technical and administrative machinery and suggested some measures for removing bottlenecks and placing the programme on a more satisfactory footing.

A suggestion to make water supply and sewerage schemes in urban areas 'self-supporting' was also made by the Conference of Public Health Engineers held in New Delhi in November last year.

The conference expressed the view that the present policy in regard to the promotion, financing and management of urban schemes would require a radical re-orientation in order to achieve better progress in future years. It suggested that local bodies should be encourged to float loans and debentures for providing water supply and sewarage facilities.

The conference wanted the operation and management of water supply and sewerage systems to be placed on a more satisfactory and efficient basis in order to attract more capital towards the prosecution of such schemes in the future. It recommended the setting up of regional water and sewerage boards clothed with statutory powers to design, execute and operate water supply and sewerage systems for the urban areas.

International Awards for Research Scholars

The trustees of the Lady Tata Memorial Trust have announced the awards of scholarships and grants for 1961-62. These awards are instituted in memory of the Lady Meherbai Dorabji Tata.

International awards of varying amounts (totalling £4,350) for research in Diseases of the Blood with special reference to Leukaemias are made to: Dr. (Miss) B. M. Braganca (India), Dr. L. Chieco-Bianchi (Italy), Dr. H. J. Woodliff (England), Drs. Amiel and Mathe (France), Dr. G. Wynne Griffith (Great Britain), and Dr. B. Legerlof (Sweden).

Indian scholarships of Rs. 250 per month each for one year for scientific investigations having a bearing on the alleviation of human suffering from disease are awarded to: Miss M. Indira (Bangalore), Mr. V. S. Rao (Hyderabad), Mr. A. K. Ray (Calcutta), Mr. S. K. Sankarappa (Madras), Mr. V. N. Gogte (Bombay), Dr. (Mrs.) Saroj Mehta (New Delhi) and Dr. R. K. Panja (Calcutta).

Indian Science Congress, 1962

Cuttack will be the venue of the next annual session of the Indian Science Congress in January 1962, for which preliminary preparations have commenced under the local committee with Dr. P. Parija, a member of the Executive Committee of the Congress and Vice-Chancellor, Utkal University and Dr. R. N. Rath, Secretary.

Indian Pharmaceutical Congress

The Fourteenth Session of the Indian Pharmaceutical Congress will be held at Cuttack during December 29-31, 1961. Persons desirous to attend the session or participate in the sections of Pharmacy, Pharmaceutical and Analytical Chemistry, Pharmacology, Pharmacognosy, Indigenous Medicine, Retail Pharmacy or Industrial Pharmacy should contact the Hony. General Secretary, 14 Ganesh Chandra Avenue, Calcutta 13, for railway concession and registration forms.

Third Plan Schemes on Promotion of Health

A programme for the eradication of malaria and smallpox and more effective control of tuberculosis and other communicable diseases, an intensified family planning drive and a sizable increase in medical education and health training and research facilities are the highlights of the Third Five Year Plan for Health.

The Health Plan also includes a modest programme of expansion of health services and what health experts describe as a "grossly inadequate" provision for protected water supply and sanitation in urban and rural areas.

Fifteen new medical colleges to augment the present number of 60 are also to be set up during the Third Plan. These institutions are estimated to raise the rate

of annual admissions from the present figure of 6,000 to 8,000. Five new Ayurvedic colleges and the extension of the 30 existing ones are also planned.

With the expansion of facilities for medical education it is estimated that by the end of the Third Plan, the number of doctors practising modern medicine will increase from the present figure of 70,000 to 90,000.

Under the scheme of expansion of general medical service, 2,000 hospitals and dispensaries will be added to the existing 10,000 before the end of the Plan. The number of beds is proposed to be increased by 50,000.

Besides the new hospitals and dispensaries for modern medicine, 1,800 Ayurvedic dispensaries are also to be opened during the Plan period.

The total financial allocation for health is Rs. 321 crores, but the Planning Commission is understood to have asked the Union Health Ministry to prepare the physical targets on the basis of a higher figure, namely Rs. 341 crores. The authorities hope that the finances would be available later to fulfil all the targets.

The Union Health Ministry has made the allocations under the various heads on the basis of the higher figure of Rs. 341 crores.

The outlays are: Water supply and sanitation—Rs. 105 crores (Rs. 89 crores for urban and Rs. 16 crores for rural areas); development of hospitals and dispensaries—Rs. 62 crores; medical education, health training and research in medicine—Rs. 56 crores; prevention of communicable diseases—Rs. 70 crores; development of indigenous systems of medicine—Rs. 10 crores; family planning—Rs. 27 crores and miscellaneous —Rs. 11 crores. Total Rs. 341 crores.

Of this amount, Rs. 296 crores will be spent in the States' sector and Rs. 45 crores in the Central sector. The gap of Rs. 20 crores between the financial resources and the physical targets is mostly in the Central sector.

Among other Central schemes are development of cancer research, extension of the contributory health service (C.H.S.) to other cities, morbidity surveys, refresher course for general medical practitioners, establishment of a National Health Museum and a Central Medical Library and reinforcement of the Central Drug Laboratory and Drug Control Organisation.

Included in the Centrally-sponsored scheme are post-graduate medical education, research in indigenous systems of medicine and family planning.

Apart from opening 15 colleges for modern medicine and five Ayurvedic colleges during the Third Plan, the Union Health Ministry proposes to start five or six post-graduate education centres on a regional basis for training teachers and specialists so that the short-fall of nearly 2,000 teachers is made up during the course of the Plan.

According to health experts, the health plan has undergone drastic pruning since it was first drawn up by the working group. The working group had worked out a plan of Rs. 700 crores, which has now been reduced to less than half.

The experts, however, point out that in cutting down on Plan schemes, care has been taken not to reduce the emphasis on the preventive aspect of health.

In the Central schemes, there are two types of schemes—Central schemes and Centrally-sponsored schemes. The Central schemes include maintenance and improvement of institutions like the All-India Institute of Medical Sciences in New Delhi, Lady Hardinge Medical College in New Delhi, the All-India Institute of Mental Health at Bangalore, the Medical College at Pondicherry and the College of Nursing in Delhi.

Indian Pharmacopoeia Committee

The Government of India have extended the term of the Indian Pharmacopoeia Committee for a further period of six months. This decision has been taken to retain the continuity of its work and to enable it to finalise the pharmacopoeia.

The Committee was constituted in November 1948 because many drugs being used in the country were not included in the British Pharmacopoeia but were of sufficient medicinal value to justify their inclusion in an official pharmacopoeia.

New Experiment in Blood Transfusion

Dr. J. G. Jolly, Medical Officer in-charge of the U.P. State Blood Bank in collaboration with Dr. Mrs. N. K. Mehra, surgeon of Queen Mary's Hospital, made the second experiment in blood transfusion in a newly born baby in the Queen Mary's Hospital on 23-6-61.

Giving details of the experiment Dr. Jolly told newsmen that the baby born at the hospital was "lemon jaundiced" immediately after birth, as a result of what he called destruction of blood on account of variation in the blood group factor of the mother and the father of the baby.

In such babies there was no chance of survival unless the destroyed blood of the baby was taken out and replaced by a suitable type of blood.

He said that immediately after the birth of the baby the exchange blood transfusion was performed. The entire blood of the baby was replaced by a suitable type of blood.

Variations in Prices of Drugs

The question of variations in the prices of drugs and the steps to be taken to rationalise the prevailing price structure was considered at a meeting of the representatives of leading pharmaceutical firms convened by the Minister for Public Health, Mr. Homi J. H. Taleyarkhan, at Sachivalaya at Bombay on 13-6-61.

A sub-committee of representatives of the manufacturers, wholesalers, and retailers was formed to ascertain whether there are wide variations in the prices of the essential drugs which are in large demand. Mr. M. K. Rangnekar, Director of Drugs Control Administration, is the convener and the sub-committee has been asked to submit its report within a month's time.

The representatives of the pharmaceutical firms and the trade were of the view that the variations in prices were mostly locality-wise for which many factors have been responsible, namely establishment charges of the pharmacy and the presence of competing chemists

and druggists nearby. There was, however, the unanimous view that the prices of medicines had come down considerably in recent years and that there was no cause for alarm on that account.

REVIEWS

The Medical Annual, 1960—Edited by R. Bodley Scott and Milnes Walker; John Wright & Sons Ltd., Bristol, U.K.; 8½″×5½″, pp. 572; 42s.

This is the seventyeighth year of continuous publication of this important year-book, analysing the progress of the year in different branches of medicine. The Medical Annual has developed a time-honoured tradition in presentation which the current issue has well maintained. The interesting features are its special articles and this year there are four such articles, all well written and informative. But the important feature is its review of the year's work in different sections of medical science, although it is not possible in such a publication to satisfy all the different specialists. Undoubtedly this will be a great help to the busy general practitioner who wants to keep himself well informed about the current trends in medicine. However, occasional review of the worthwhile work from India would justify its claim as the reviewer of the "Medical and Surgical Progress available in English language".

H. S. CHAKRAVARTI

Practical Medicine, Vol. I, Clinical Examination—By Charu Chandra Saha; published by the author, Calcutta; 7″×5″, pp. 360; Rs. 16·00.

This book of practical medicine is primarily meant for the beginners in the medical colleges and intends to teach them the techniques of clinical examination. The attempt of the author in this respect is praiseworthy. The methods of physical examination have been presented in a very lucid way with many illustrations and diagrams. It is really a matter of controversy whether bed-side clinical laboratory examinations should be completely excluded from such an elementary work. The author has refrained to describe even the bare minimum of such methods which the students are called upon to do every day in the ward. Surely "a speciality in the form of clinical pathology" has not been already developed for the third year medical student. However, findings of various laboratory investigations have been discussed often in great details such as gastric analysis, glucose tolerance test, etc. The significance of aldehyde test in kala-azar has been discussed without mentioning what aldehyde test is. One wonders whether theoretical discussion of the interpretation of laboratory findings with the exclusion of the outline of the methods is desirable in a book of practical medicine.

There are many omissions and commissions in this book. Sternal puncture, aspiration of liver abscess, urinary bladder catheterisation and many other ordinary techniques are omitted. Bronchoscopy, oesophagoscopy and radiography of oesophagus and such others, should have been mentioned. Instruments which are being used every day in the wards such as Ryle's tube, urinary catheter, L.P. needles, etc., should have been introduced to the students.

In discussing the findings of laboratory investigations, there is a lack of balance in many cases. In kidney function test, although description of Immulin clearance test has been attempted in some details, the more important, bed-side urinary concentration test has been omitted. Clotting time has been described as 10-15 min. at room temperature, either by mistake or the author possibly meant the less commonly used Lee and White method or Howells method.

Light reflex and accommodation reflex have been discussed in such a way that even the teachers will be confused. The difference between the upper motor and lower motor type of XII nerve lesion has been wrongly tabulated.

The book should be thoroughly re-arranged, revised and corrected before it is put into circulation.

H. S. CHAKRAVARTI

Indian Journal of Microbiology, Vol. I, No. 1, January-March, 1961—Association of Microbiologists of India, Calcutta; 10″×7½″, pp. 64; annual subscription Rs. 15·00 (inland) and Rs. 20·00 (overseas), single copy Rs. 4·00 (inland) and Rs. 6·00 (overseas).

The newcomer in the world of journals is really very welcome. The first issue deserves all the more the heartiest greetings of a sister journal.

So far, the media for publication of research in different aspects and application of microbiology have been diverse. Papers on medical microbiology have to be published only in medical journals, as much as those on microbiology applied to veterinary medicine compose parts of general veterinary literature. Agricultural and soil microbiology fermentation and microbiological chemistry, antibiotic research, general mycology and virology, restrict themselves to specialised journals. The *Indian Journal of Microbiology* throws open the prospect of amalgamating what would otherwise continue to be scattered publications. Its continued progress should, therefore, attract the cream of microbiological contributions to crave the hospitality of its pages.

The first issue looks and reads well. Thus, it arouses the hope that it would improve so much as to compare itself very well with any other similar journal anywhere in the world.

D. C. L.

Medicine, Science and the Law, Vol. I, No. 1, October 1960; Sweet & Maxwell Ltd., 11 New Fetter Lane, London E.C.4; 9½″×7″; pp. viii+132; post free annual subscription £3. 3s.

All articles appearing in the journal are very interesting and instructive and of high standard. The get up of the journal as a whole is very good.

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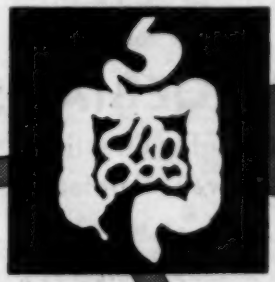

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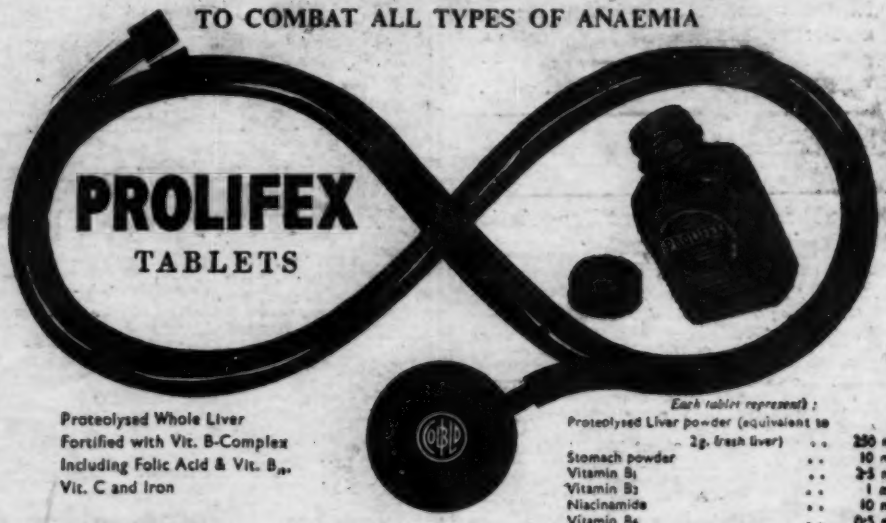

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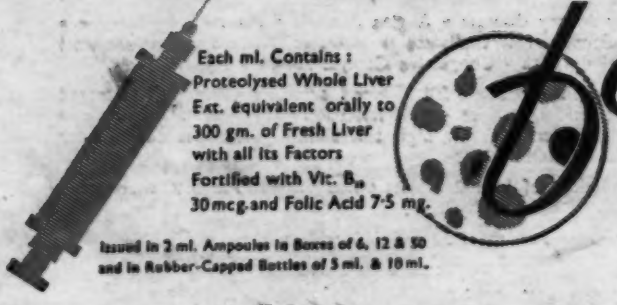

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